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☑ Final Report
☐ Revised Report

Report Date:
26-Jul-17 13:25

Laboratory Report
SC36391

Gulf Oil L.P.
281 Eastern Avenue
Chelsea, MA 02150
Attn: Andrew P. Adams

Project: Gulf Terminal - Chelsea, MA
Project #: Gulf Chelsea

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87936
Maine # MA138
New Hampshire # 2972/2538
New Jersey # MA011
New York # 11393
Pennsylvania # 68-04426/68-02924
Rhode Island # LAO00348
USDA # P330-15-00375
Vermont # VT-11393

Authorized by:

Christina White
Laboratory Director

Eurofins Spectrum Analytical holds primary certification in the State of Massachusetts for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of Massachusetts does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.
Please note that this report contains 28 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

Eurofins Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Eurofins Spectrum Analytical, Inc. is currently accredited for the specific method or analyte indicated. Please refer to our 'Quality' web page at www.spectrum-analytical.com for a full listing of our current certifications and fields of accreditation. States in which Eurofins Spectrum Analytical, Inc. holds NELAC certification are New York, New Hampshire, New Jersey, Pennsylvania and Florida. All analytical work for Volatile Organic and Air analysis are transferred to and conducted at our 830 Silver Street location (PA-68-04426).

Please contact the Laboratory or Technical Director at 800-789-9115 with any questions regarding the data contained in this laboratory report.

Sample Summary

Work Order: SC36391

Project: Gulf Terminal - Chelsea, MA

Project Number: Gulf Chelsea

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SC36391-01	Chelsea Creek	Surface Water	27-Jun-17 10:00	28-Jun-17 14:05
SC36392-01	Outfall 003	Surface Water	27-Jun-17 10:00	28-Jun-17 14:05

CASE NARRATIVE:

Data has been reported to the MDL. This report includes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the detection limit are reported as "<" (less than) the detection limit in this report.

The samples were received 3.2 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group.

Analyses for Total Hardness, pH, and Total Residual Chlorine fall under the state of Pennsylvania code Chapter 252.6 accreditation by rule.

Please note this report contains 30 pages of analytical data from New England Boiassay, A division of GZA.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

EPA 200.8

Spikes:

1712715-MS1 *Source: SC36391-01*

The spike recovery was outside acceptance limits for the MS, MSD and/or PS due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.

Copper

1712715-PS1 *Source: SC36391-01*

The spike recovery was outside acceptance limits for the MS, MSD and/or PS due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.

Copper

Duplicates:

1712715-DUP1 *Source: SC36391-01*

RPD out of acceptance range. The batch is accepted based upon LCS and/or LCSD recovery.

Copper
Nickel

The Reporting Limit has been raised to account for matrix interference.

Cadmium
Copper
Lead
Nickel

1712781-DUP1 *Source: SC36391-01*

The Reporting Limit has been raised to account for matrix interference.

Zinc

Samples:

SC36391-01 *Chelsea Creek*

EPA 200.8

Samples:

SC36391-01 *Chelsea Creek*

The Reporting Limit has been raised to account for matrix interference.

Cadmium
Copper
Lead
Nickel
Zinc

SM 9222D-97

Samples:

SC36392-01 *Outfall 003*

This sample was analyzed outside the EPA recommended holding time per client request.

Fecal Coliforms

SW846 8260C

Calibration:

1706082

Analyte quantified by quadratic equation type calibration.

Naphthalene

This affected the following samples:

1711116-BLK1
1711116-BLK2
1711116-BS1
1711116-BS2
1711116-BSD1
1711116-BSD2
Chelsea Creek
Outfall 003
S705740-ICV1
S705898-CCV1

Laboratory Control Samples:

1711116 BS/BSD

Tert-Butanol / butyl alcohol percent recoveries (137/121) are outside individual acceptance criteria (70-130), but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

Outfall 003

1711116 BSD

Ethanol RPD 43% (20%) is outside individual acceptance criteria.

Tert-Butanol / butyl alcohol RPD 21% (20%) is outside individual acceptance criteria.

SW846 8270D

Calibration:

1706036

SW846 8270D

Calibration:

1706036

Analyte quantified by quadratic equation type calibration.

2,4-Dinitrophenol
4,6-Dinitro-2-methylphenol

This affected the following samples:

1711096-BLK1
1711096-BS1
1711096-BSD1
Outfall 003
S705262-ICV1
S706037-CCV1
S706219-CCV1

Samples:

SC36392-01 *Outfall 003*

Duplicate analysis confirmed surrogate failure due to matrix effects.

2-Fluorophenol
Phenol-d5

SC36392-01RE1 *Outfall 003*

Duplicate analysis confirmed surrogate failure due to matrix effects.

2-Fluorophenol
Phenol-d5

SW846 8270D SIM

Calibration:

1704025

Analyte quantified by quadratic equation type calibration.

Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (e) pyrene-d12
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Dibenzo (a,h) anthracene
Indeno (1,2,3-cd) pyrene

This affected the following samples:

1711096-BLK2
1711096-BS2
1711096-BSD2
Chelsea Creek
Outfall 003
S703654-ICV1
S706180-CCV1
S706181-CCV1

Samples:

S706180-CCV1

SW846 8270D SIM

Samples:

S706180-CCV1

Analyte percent drift is outside individual acceptance criteria (20), but within overall method allowances.

Benzo (k) fluoranthene (24.8%)

This affected the following samples:

1711096-BLK2
1711096-BS2
1711096-BSD2
Chelsea Creek
Outfall 003

Sample Acceptance Check Form

Client:	Gulf Oil L.P.
Project:	Gulf Terminal - Chelsea, MA / Gulf Chelsea
Work Order:	SC36391
Sample(s) received on:	6/28/2017

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	Yes	No	N/A
Were custody seals present?	☐	☑	☐
Were custody seals intact?	☐	☐	☑
Were samples received at a temperature of ≤ 6°C?	☑	☐	☐
Were samples refrigerated upon transfer to laboratory representative?	☑	☐	☐
Were sample containers received intact?	☑	☐	☐
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	☑	☐	☐
Were samples accompanied by a Chain of Custody document?	☑	☐	☐
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	☑	☐	☐
Did sample container labels agree with Chain of Custody document?	☑	☐	☐
Were samples received within method-specific holding times?	☑	☐	☐

Sample Acceptance Check Form

Client:	Gulf Oil L.P.
Project:	Gulf Terminal - Chelsea, MA / Gulf Chelsea
Work Order:	SC36392
Sample(s) received on:	6/28/2017

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	Yes	No	N/A
Were custody seals present?	☐	☑	☐
Were custody seals intact?	☐	☐	☑
Were samples received at a temperature of ≤ 6°C?	☑	☐	☐
Were samples refrigerated upon transfer to laboratory representative?	☑	☐	☐
Were sample containers received intact?	☑	☐	☐
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	☑	☐	☐
Were samples accompanied by a Chain of Custody document?	☑	☐	☐
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	☑	☐	☐
Did sample container labels agree with Chain of Custody document?	☑	☐	☐
Were samples received within method-specific holding times?	☑	☐	☐

Summary of Hits

Lab ID: SC36391-01 **Client ID:** Chelsea Creek

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Ammonia as Nitrogen	0.10		0.05	mg/L	E350.1
Cadmium	0.00019	R01, J,	0.00125	mg/l	EPA 200.8
Copper	0.194	R01, D	0.00250	mg/l	EPA 200.8
Lead	0.00184	R01, D	0.00125	mg/l	EPA 200.8
Nickel	0.0166	R01, D	0.00125	mg/l	EPA 200.8
Zinc	0.0209	R01, J	0.0250	mg/l	EPA 200.8
Salinity	24.6		1.00	ppt (1000)	SM 2520 (01)
Total Solids	29000		100	mg/l	SM2540 B (11)
Total Suspended Solids	9.0		0.8	mg/l	SM2540D (11)
Total Residual Chlorine	0.028		0.020	mg/l	SM4500-Cl-G (11)
Total Organic Carbon	3.28		1.00	mg/l	SM5310B (00, 11)

Lab ID: SC36392-01 **Client ID:** Outfall 003

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Ammonia as Nitrogen	0.26		0.05	mg/L	E350.1
Total Solids	488		5.00	mg/l	SM2540 B (11)
Total Suspended Solids	10.3		0.8	mg/l	SM2540D (11)
Total Residual Chlorine	0.066		0.020	mg/l	SM4500-Cl-G (11)
Total Organic Carbon	7.18		1.00	mg/l	SM5310B (00, 11)
Zinc	0.011		0.002	mg/L	SW6010C
Chromium	0.0133		0.0050	mg/L	SW6020B
Lead	0.0067		0.0004	mg/L	SW6020B
Nickel	0.0045		0.0005	mg/L	SW6020B

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
Chelsea Creek	Gulf Chelsea	Surface Water	27-Jun-17 10:00	28-Jun-17
SC36391-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Aromatics by SW846 8260 Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	< 1.0		µg/l	1.0	0.3	1	SW846 8260C	30-Jun-17	30-Jun-17	GMA	1711116	
100-41-4	Ethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	
91-20-3	Naphthalene	< 1.0		µg/l	1.0	0.4	1	"	"	"	"	"	
108-88-3	Toluene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	
179601-23-1	m,p-Xylene	< 2.0		µg/l	2.0	0.4	1	"	"	"	"	"	
95-47-6	o-Xylene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*103*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*103*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*103*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*102*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
SVOCs by SIM Prepared by method SW846 3510C													
83-32-9	Acenaphthene	< 0.049		µg/l	0.049	0.007	1	SW846 8270D SIM	30-Jun-17	10-Jul-17	MSL	1711096	
208-96-8	Acenaphthylene	< 0.049		µg/l	0.049	0.013	1	"	"	"	"	"	
120-12-7	Anthracene	< 0.049		µg/l	0.049	0.008	1	"	"	"	"	"	
56-55-3	Benzo (a) anthracene	< 0.049		µg/l	0.049	0.017	1	"	"	"	"	"	
50-32-8	Benzo (a) pyrene	< 0.049		µg/l	0.049	0.020	1	"	"	"	"	"	
205-99-2	Benzo (b) fluoranthene	< 0.049		µg/l	0.049	0.020	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	< 0.049		µg/l	0.049	0.019	1	"	"	"	"	"	
207-08-9	Benzo (k) fluoranthene	< 0.049		µg/l	0.049	0.018	1	"	"	"	"	"	
218-01-9	Chrysene	< 0.049		µg/l	0.049	0.005	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	< 0.049		µg/l	0.049	0.018	1	"	"	"	"	"	
206-44-0	Fluoranthene	< 0.049		µg/l	0.049	0.004	1	"	"	"	"	"	
86-73-7	Fluorene	< 0.049		µg/l	0.049	0.012	1	"	"	"	"	"	
193-39-5	Indeno (1,2,3-cd) pyrene	< 0.049		µg/l	0.049	0.021	1	"	"	"	"	"	
91-20-3	Naphthalene	< 0.049		µg/l	0.049	0.021	1	"	"	"	"	"	
85-01-8	Phenanthrene	< 0.049		µg/l	0.049	0.008	1	"	"	"	"	"	
129-00-0	Pyrene	< 0.049		µg/l	0.049	0.006	1	"	"	"	"	"	
Surrogate recoveries:													
205440-82-0	*Benzo (e) pyrene-d12*	*69*			*30-130 %*			"	"	"	"	"	
Total Metals by EPA 200/6000 Series Methods Prepared by method General Prep-Metal													
	Preservation	**Field Preserved; pH<2 confirmed**		N/A			1	EPA 200/6000 methods	28-Jun-17		AAW	1710965	
Total Metals by EPA 200 Series Methods													
7440-43-9	Cadmium	**0.00019**	R01, J, D	mg/l	0.00125	0.00019	5	EPA 200.8	25-Jul-17	25-Jul-17	TBC	1712715	X
7440-50-8	Copper	**0.194**	R01, D	mg/l	0.00250	0.00044	10	"	"	26-Jul-17	"	"	X
7440-02-0	Nickel	**0.0166**	R01, D	mg/l	0.00125	0.00025	5	"	"	25-Jul-17	"	"	X
7439-92-1	Lead	**0.00184**	R01, D	mg/l	0.00125	0.00012	5	"	"	"	"	"	X
7440-66-6	Zinc	**0.0209**	R01, J,LIV	mg/l	0.0250	0.0116	1	"	25-Jul-17	26-Jul-17	"	1712781	X

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
Chelsea Creek SC36391-01	Gulf Chelsea	Surface Water	27-Jun-17 10:00	28-Jun-17

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
General Chemistry Parameters													
7782-50-5	Total Residual Chlorine	**0.028**	ClHT	mg/l	0.020	0.006	1	SM4500-Cl-G (11)	30-Jun-17 09:38	05-Jul-17 11:27	RLT	1711119	X
	pH	**7.92**	pH	pH Units			1	ASTM D 1293-99B	28-Jun-17 10:00	29-Jun-17 14:20	TN	1710957	X
	Salinity	**24.6**		ppt (1000)	1.00	0.144	1	SM 2520 (01)	06-Jul-17	06-Jul-17	BD	1711426	
	Total Solids	**29,000**	LIV	mg/l	100	30.6	1	SM2540 B (11)	29-Jun-17	05-Jul-17	CMB	1711007	
	Total Suspended Solids	**9.0**		mg/l	0.8	0.4	1	SM2540D (11)	29-Jun-17	30-Jun-17	CMB	1711008	X
	Total Organic Carbon	**3.28**		mg/l	1.00	0.246	1	SM5310B (00, 11)	07-Jul-17	07-Jul-17	RLT	1711573	X
Subcontracted Analyses													
Prepared by method NA													
Analysis performed by GZA Geoenvironmental, Inc. - Manchester, CT -*													
	Aquatic Toxicity	**See Report**		N/A			1	EPA-821-R-02-012				'[none]'	
Subcontracted Analyses													
Prepared by method 392124													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
7664-41-7	Ammonia as Nitrogen	**0.10**		mg/L	0.05	0.05	1	E350.1	"	03-Jul-17 10:38	MACT0	392124A	

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
Outfall 003	Gulf Chelsea	Surface Water	27-Jun-17 10:00	28-Jun-17
SC36392-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile Organic Compounds													
Volatile Organic Compounds by SW846 8260 Prepared by method SW846 5030 Water MS													
71-43-2	Benzene	< 1.00		µg/l	1.00	0.28	1	SW846 8260C	30-Jun-17	30-Jun-17	GMA	1711116	
100-41-4	Ethylbenzene	< 1.00		µg/l	1.00	0.33	1	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	< 1.00		µg/l	1.00	0.24	1	"	"	"	"	"	
91-20-3	Naphthalene	< 1.00		µg/l	1.00	0.35	1	"	"	"	"	"	
108-88-3	Toluene	< 1.00		µg/l	1.00	0.30	1	"	"	"	"	"	
75-01-4	Vinyl chloride	< 1.00		µg/l	1.00	0.47	1	"	"	"	"	"	
179601-23-1	m,p-Xylene	< 2.00		µg/l	2.00	0.38	1	"	"	"	"	"	
95-47-6	o-Xylene	< 1.00		µg/l	1.00	0.28	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 10.0		µg/l	10.0	5.90	1	"	"	"	"	"	
64-17-5	Ethanol	< 200		µg/l	200	30.9	1	"	"	"	"	"	
Surrogate recoveries:													
460-00-4	*4-Bromofluorobenzene*	*101*			*70-130 %*			"	"	"	"	"	
2037-26-5	*Toluene-d8*	*103*			*70-130 %*			"	"	"	"	"	
17060-07-0	*1,2-Dichloroethane-d4*	*102*			*70-130 %*			"	"	"	"	"	
1868-53-7	*Dibromofluoromethane*	*105*			*70-130 %*			"	"	"	"	"	
Semivolatile Organic Compounds by GCMS													
Acid Extractables/Phenols Prepared by method SW846 3510C													
108-95-2	Phenol	< 0.645	U	µg/l	5.00	0.645	1	SW846 8270D	30-Jun-17	04-Jul-17	MSL	1711096	
Surrogate recoveries:													
367-12-4	*2-Fluorophenol*	*7*	SDUP		*15-110 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*12*	SDUP		*15-110 %*			"	"	"	"	"	
Re-analysis of Acid Extractables/Phenols Prepared by method SW846 3510C													
59-50-7	4-Chloro-3-methylphenol	< 0.501	U	µg/l	5.00	0.501	1	SW846 8270D	30-Jun-17	12-Jul-17	MSL	1711096	
95-57-8	2-Chlorophenol	< 0.748	U	µg/l	5.00	0.748	1	"	"	"	"	"	
120-83-2	2,4-Dichlorophenol	< 0.530	U	µg/l	5.00	0.530	1	"	"	"	"	"	
105-67-9	2,4-Dimethylphenol	< 0.653	U	µg/l	5.00	0.653	1	"	"	"	"	"	
534-52-1	4,6-Dinitro-2-methylphenol	< 0.319	U	µg/l	5.00	0.319	1	"	"	"	"	"	
51-28-5	2,4-Dinitrophenol	< 0.561	U	µg/l	5.00	0.561	1	"	"	"	"	"	
95-48-7	2-Methylphenol	< 0.665	U	µg/l	5.00	0.665	1	"	"	"	"	"	
108-39-4, 106-44-5	3 & 4-Methylphenol	< 0.615	U	µg/l	10.0	0.615	1	"	"	"	"	"	
88-75-5	2-Nitrophenol	< 0.465	U	µg/l	5.00	0.465	1	"	"	"	"	"	
100-02-7	4-Nitrophenol	< 0.838	U	µg/l	5.00	0.838	1	"	"	"	"	"	
87-86-5	Pentachlorophenol	< 0.373	U	µg/l	5.00	0.373	1	"	"	"	"	"	
108-95-2	Phenol	< 0.645	U	µg/l	5.00	0.645	1	"	"	"	"	"	
95-95-4	2,4,5-Trichlorophenol	< 0.520	U	µg/l	5.00	0.520	1	"	"	"	"	"	
88-06-2	2,4,6-Trichlorophenol	< 0.518	U	µg/l	5.00	0.518	1	"	"	"	"	"	
Surrogate recoveries:													
367-12-4	*2-Fluorophenol*	*7*	SDUP		*15-110 %*			"	"	"	"	"	
4165-62-2	*Phenol-d5*	*11*	SDUP		*15-110 %*			"	"	"	"	"	
SVOCs by SIM Prepared by method SW846 3510C													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
Outfall 003	Gulf Chelsea	Surface Water	27-Jun-17 10:00	28-Jun-17
SC36392-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Semivolatile Organic Compounds by GCMS													
SVOCs by SIM													
Prepared by method SW846 3510C													
83-32-9	Acenaphthene	< 0.050		µg/l	0.050	0.007	1	SW846 8270D SIM	30-Jun-17	10-Jul-17	MSL	1711096	
208-96-8	Acenaphthylene	< 0.050		µg/l	0.050	0.013	1	"	"	"	"	"	
120-12-7	Anthracene	< 0.050		µg/l	0.050	0.008	1	"	"	"	"	"	
56-55-3	Benzo (a) anthracene	< 0.050		µg/l	0.050	0.017	1	"	"	"	"	"	
50-32-8	Benzo (a) pyrene	< 0.050		µg/l	0.050	0.020	1	"	"	"	"	"	
205-99-2	Benzo (b) fluoranthene	< 0.050		µg/l	0.050	0.020	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	< 0.050		µg/l	0.050	0.019	1	"	"	"	"	"	
207-08-9	Benzo (k) fluoranthene	< 0.050		µg/l	0.050	0.019	1	"	"	"	"	"	
218-01-9	Chrysene	< 0.050		µg/l	0.050	0.005	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	< 0.050		µg/l	0.050	0.018	1	"	"	"	"	"	
206-44-0	Fluoranthene	< 0.050		µg/l	0.050	0.004	1	"	"	"	"	"	
86-73-7	Fluorene	< 0.050		µg/l	0.050	0.012	1	"	"	"	"	"	
193-39-5	Indeno (1,2,3-cd) pyrene	< 0.050		µg/l	0.050	0.022	1	"	"	"	"	"	
91-20-3	Naphthalene	< 0.050		µg/l	0.050	0.022	1	"	"	"	"	"	
85-01-8	Phenanthrene	< 0.050		µg/l	0.050	0.008	1	"	"	"	"	"	
129-00-0	Pyrene	< 0.050		µg/l	0.050	0.007	1	"	"	"	"	"	
Surrogate recoveries:													
205440-82-0	*Benzo (e) pyrene-d12*	*60*			*30-130 %*			"	"	"	"	"	
Total Metals by EPA 200/6000 Series Methods													
Prepared by method General Prep-Metal													
	Preservation	**Field Preserved; pH<2 confirmed**		N/A			1	EPA 200/6000 methods	28-Jun-17		AAW	1710965	
General Chemistry Parameters													
7782-50-5	Total Residual Chlorine	**0.066**	ClHT	mg/l	0.020	0.006	1	SM4500-Cl-G (11)	30-Jun-17 09:38	05-Jul-17 11:35	RLT	1711119	X
	pH	**8.01**	pH	pH Units			1	ASTM D 1293-99B	28-Jun-17 10:00	29-Jun-17 14:20	TN	1710957	X
	Salinity	< 1.00		ppt (1000)	1.00	0.144	1	SM 2520 (01)	06-Jul-17	06-Jul-17	BD	1711426	
	Total Solids	**488**		mg/l	5.00	1.53	1	SM2540 B (11)	29-Jun-17	05-Jul-17	CMB	1711007	
	Total Suspended Solids	**10.3**		mg/l	0.8	0.4	1	SM2540D (11)	29-Jun-17	30-Jun-17	CMB	1711008	X
	Total Organic Carbon	**7.18**		mg/l	1.00	0.246	1	SM5310B (00, 11)	07-Jul-17	07-Jul-17	RLT	1711573	X
Microbiological Analyses													
	Fecal Coliforms	**124**	O09, D	CFU/100 ml			2	SM 9222D-97	28-Jun-17 14:51	28-Jun-17 14:51	NV	1710945	X
Subcontracted Analyses													
Prepared by method NA													
Analysis performed by GZA Geoenvironmental, Inc. - Manchester, CT -*													
	Aquatic Toxicity	**See Report**		N/A			1	EPA-821-R-02-012				'[none]'	
Subcontracted Analyses													
Prepared by method 392124													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
7664-41-7	Ammonia as Nitrogen	**0.26**		mg/L	0.05	0.05	1	E350.1	"	03-Jul-17 10:39	MACT0	392124A	
Subcontracted Analyses													

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
Outfall 003	Gulf Chelsea	Surface Water	27-Jun-17 10:00	28-Jun-17
SC36392-01				

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Subcontracted Analyses													
Prepared by method 394642-													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
7440-66-6	Zinc	**0.011**		mg/L	0.002	0.002	1	SW6010C	18-Jul-17	21-Jul-17 13:34	MACT0	394642A	
Subcontracted Analyses													
Prepared by method 394271-													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
7440-47-3	Chromium	**0.0133**		mg/L	0.0050	0.0050	5	SW6020B	"	19-Jul-17 16:04	MACT0	394271A	
7440-43-9	Cadmium	< 0.0002		mg/L	0.0002	0.0002	1	"	"	19-Jul-17 16:41	"	"	
7439-92-1	Lead	**0.0067**		mg/L	0.0004	0.0004	1	"	"	"	"	"	
7440-02-0	Nickel	**0.0045**		mg/L	0.0005	0.0005	1	"	"	"	"	"	
7440-50-8	Copper	< 0.025		mg/L	0.025	0.025	5	"	"	21-Jul-17 13:27	"	"	
Subcontracted Analyses													
Prepared by method 393336													
*Analysis performed by Phoenix Environmental Labs, Inc. * - MACT007*													
	Oil and Grease by EPA 1664A	< 1.5		mg/L	1.5	1.5	1	E1664A		12-Jul-17 06:33	MACT0	393336A	

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1711116 - SW846 5030 Water MS										
Blank (1711116-BLK1)					Prepared & Analyzed: 30-Jun-17					
Benzene	< 1.00		µg/l	1.00						
Benzene	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.00		µg/l	1.00						
Ethylbenzene	< 1.0		µg/l	1.0						
Methyl tert-butyl ether	< 1.00		µg/l	1.00						
Naphthalene	< 1.0		µg/l	1.0						
Naphthalene	< 1.00		µg/l	1.00						
Toluene	< 1.00		µg/l	1.00						
Toluene	< 1.0		µg/l	1.0						
Vinyl chloride	< 1.00		µg/l	1.00						
m,p-Xylene	< 2.0		µg/l	2.0						
m,p-Xylene	< 2.00		µg/l	2.00						
o-Xylene	< 1.0		µg/l	1.0						
o-Xylene	< 1.00		µg/l	1.00						
Tert-Butanol / butyl alcohol	< 10.0		µg/l	10.0						
Ethanol	< 200		µg/l	200						
Surrogate: 4-Bromofluorobenzene	*48.9*		µg/l		*50.0*		*98*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*48.9*		µg/l		*50.0*		*98*	*70-130*		
Surrogate: Toluene-d8	*52.1*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: Toluene-d8	*52.1*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.3*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.3*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: Dibromofluoromethane	*51.2*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: Dibromofluoromethane	*51.2*		µg/l		*50.0*		*102*	*70-130*		
Blank (1711116-BLK2)					Prepared & Analyzed: 30-Jun-17					
Benzene	< 5.00	D	µg/l	5.00						
Benzene	< 5.0	D	µg/l	5.0						
Ethylbenzene	< 5.0	D	µg/l	5.0						
Ethylbenzene	< 5.00	D	µg/l	5.00						
Methyl tert-butyl ether	< 5.00	D	µg/l	5.00						
Naphthalene	< 5.00	D	µg/l	5.00						
Naphthalene	< 5.0	D	µg/l	5.0						
Toluene	< 5.00	D	µg/l	5.00						
Toluene	< 5.0	D	µg/l	5.0						
Vinyl chloride	< 5.00	D	µg/l	5.00						
m,p-Xylene	< 10.0	D	µg/l	10.0						
m,p-Xylene	< 10.0	D	µg/l	10.0						
o-Xylene	< 5.0	D	µg/l	5.0						
o-Xylene	< 5.00	D	µg/l	5.00						
Tert-Butanol / butyl alcohol	< 50.0	D	µg/l	50.0						
Ethanol	< 1000	D	µg/l	1000						
Surrogate: 4-Bromofluorobenzene	*50.6*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*50.6*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: Toluene-d8	*51.1*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: Toluene-d8	*51.1*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*50.5*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*50.5*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: Dibromofluoromethane	*51.1*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: Dibromofluoromethane	*51.1*		µg/l		*50.0*		*102*	*70-130*		
LCS (1711116-BS1)					Prepared & Analyzed: 30-Jun-17					

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1711116 - SW846 5030 Water MS										
LCS (1711116-BS1)						Prepared & Analyzed: 30-Jun-17				
Benzene	**24.0**		µg/l		20.0		120	70-130		
Benzene	**24.0**		µg/l		20.0		120	70-130		
Ethylbenzene	**23.3**		µg/l		20.0		116	70-130		
Ethylbenzene	**23.3**		µg/l		20.0		116	70-130		
Methyl tert-butyl ether	**23.6**		µg/l		20.0		118	70-130		
Naphthalene	**19.5**		µg/l		20.0		97	70-130		
Naphthalene	**19.5**		µg/l		20.0		97	70-130		
Toluene	**23.3**		µg/l		20.0		116	70-130		
Toluene	**23.3**		µg/l		20.0		116	70-130		
Vinyl chloride	**25.7**		µg/l		20.0		128	70-130		
m,p-Xylene	**23.4**		µg/l		20.0		117	70-130		
m,p-Xylene	**23.4**		µg/l		20.0		117	70-130		
o-Xylene	**23.9**		µg/l		20.0		119	70-130		
o-Xylene	**23.9**		µg/l		20.0		119	70-130		
Tert-Butanol / butyl alcohol	**192**		µg/l		200		96	70-130		
Ethanol	**342**		µg/l		400		86	70-130		
Surrogate: 4-Bromofluorobenzene	*49.4*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*49.4*		µg/l		*50.0*		*99*	*70-130*		
Surrogate: Toluene-d8	*51.9*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: Toluene-d8	*51.9*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*50.4*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*50.4*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: Dibromofluoromethane	*51.7*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: Dibromofluoromethane	*51.7*		µg/l		*50.0*		*103*	*70-130*		
LCS (1711116-BS2)						Prepared & Analyzed: 30-Jun-17				
Benzene	**23.1**	D	µg/l		20.0		116	70-130		
Benzene	**23.1**	D	µg/l		20.0		116	70-130		
Ethylbenzene	**22.1**	D	µg/l		20.0		110	70-130		
Ethylbenzene	**22.1**	D	µg/l		20.0		110	70-130		
Methyl tert-butyl ether	**25.6**	D	µg/l		20.0		128	70-130		
Naphthalene	**21.2**	D	µg/l		20.0		106	70-130		
Naphthalene	**21.2**	D	µg/l		20.0		106	70-130		
Toluene	**23.1**	D	µg/l		20.0		115	70-130		
Toluene	**23.1**	D	µg/l		20.0		115	70-130		
m,p-Xylene	**22.2**	D	µg/l		20.0		111	70-130		
Vinyl chloride	**21.5**	D	µg/l		20.0		108	70-130		
m,p-Xylene	**22.2**	D	µg/l		20.0		111	70-130		
o-Xylene	**22.2**	D	µg/l		20.0		111	70-130		
o-Xylene	**22.2**	D	µg/l		20.0		111	70-130		
Tert-Butanol / butyl alcohol	**274**	D	µg/l		200		137	70-130		
Ethanol	**501**	D	µg/l		400		125	70-130		
Surrogate: 4-Bromofluorobenzene	*50.2*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*50.2*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: Toluene-d8	*51.7*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: Toluene-d8	*51.7*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.9*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.9*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: Dibromofluoromethane	*52.6*		µg/l		*50.0*		*105*	*70-130*		
Surrogate: Dibromofluoromethane	*52.6*		µg/l		*50.0*		*105*	*70-130*		
LCS Dup (1711116-BSD1)						Prepared & Analyzed: 30-Jun-17				

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8260C										
Batch 1711116 - SW846 5030 Water MS										
LCS Dup (1711116-BSD1)						Prepared & Analyzed: 30-Jun-17				
Benzene	**22.6**		µg/l		20.0		113	70-130	6	20
Benzene	**22.6**		µg/l		20.0		113	70-130	6	20
Ethylbenzene	**22.1**		µg/l		20.0		110	70-130	5	20
Ethylbenzene	**22.1**		µg/l		20.0		110	70-130	5	20
Methyl tert-butyl ether	**23.7**		µg/l		20.0		119	70-130	0.4	20
Naphthalene	**19.4**		µg/l		20.0		97	70-130	0.6	20
Naphthalene	**19.4**		µg/l		20.0		97	70-130	0.6	20
Toluene	**22.0**		µg/l		20.0		110	70-130	6	20
Toluene	**22.0**		µg/l		20.0		110	70-130	6	20
Vinyl chloride	**23.8**		µg/l		20.0		119	70-130	7	20
m,p-Xylene	**22.4**		µg/l		20.0		112	70-130	4	20
m,p-Xylene	**22.4**		µg/l		20.0		112	70-130	4	20
o-Xylene	**21.6**		µg/l		20.0		108	70-130	10	20
o-Xylene	**21.6**		µg/l		20.0		108	70-130	10	20
Tert-Butanol / butyl alcohol	**236**	QR5	µg/l		200		118	70-130	21	20
Ethanol	**392**		µg/l		400		98	70-130	14	20
Surrogate: 4-Bromofluorobenzene	*50.1*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*50.1*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: Toluene-d8	*51.8*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: Toluene-d8	*51.8*		µg/l		*50.0*		*104*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.3*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*51.3*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: Dibromofluoromethane	*51.5*		µg/l		*50.0*		*103*	*70-130*		
Surrogate: Dibromofluoromethane	*51.5*		µg/l		*50.0*		*103*	*70-130*		
LCS Dup (1711116-BSD2)						Prepared & Analyzed: 30-Jun-17				
Benzene	**22.6**	D	µg/l		20.0		113	70-130	2	20
Benzene	**22.6**	D	µg/l		20.0		113	70-130	2	20
Ethylbenzene	**22.7**	D	µg/l		20.0		114	70-130	3	20
Ethylbenzene	**22.7**	D	µg/l		20.0		114	70-130	3	20
Methyl tert-butyl ether	**26.0**	D	µg/l		20.0		130	70-130	1	20
Naphthalene	**21.9**	D	µg/l		20.0		109	70-130	3	20
Naphthalene	**21.9**	D	µg/l		20.0		109	70-130	3	20
Toluene	**23.0**	D	µg/l		20.0		115	70-130	0.3	20
Toluene	**23.0**	D	µg/l		20.0		115	70-130	0.3	20
Vinyl chloride	**23.7**	D	µg/l		20.0		119	70-130	10	20
m,p-Xylene	**23.2**	D	µg/l		20.0		116	70-130	4	20
m,p-Xylene	**23.2**	D	µg/l		20.0		116	70-130	4	20
o-Xylene	**23.1**	D	µg/l		20.0		116	70-130	4	20
o-Xylene	**23.1**	D	µg/l		20.0		116	70-130	4	20
Tert-Butanol / butyl alcohol	**241**	D	µg/l		200		121	70-130	13	20
Ethanol	**323**	D	µg/l		400		81	70-130	43	20
Surrogate: 4-Bromofluorobenzene	*50.1*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: 4-Bromofluorobenzene	*50.1*		µg/l		*50.0*		*100*	*70-130*		
Surrogate: Toluene-d8	*51.1*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: Toluene-d8	*51.1*		µg/l		*50.0*		*102*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*50.4*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: 1,2-Dichloroethane-d4	*50.4*		µg/l		*50.0*		*101*	*70-130*		
Surrogate: Dibromofluoromethane	*52.4*		µg/l		*50.0*		*105*	*70-130*		
Surrogate: Dibromofluoromethane	*52.4*		µg/l		*50.0*		*105*	*70-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 1711096 - SW846 3510C										
Blank (1711096-BLK1)					Prepared: 30-Jun-17 Analyzed: 04-Jul-17					
4-Chloro-3-methylphenol	< 0.501	U	µg/l	0.501						
2-Chlorophenol	< 0.748	U	µg/l	0.748						
2,4-Dichlorophenol	< 0.530	U	µg/l	0.530						
2,4-Dimethylphenol	< 0.653	U	µg/l	0.653						
4,6-Dinitro-2-methylphenol	< 0.319	U	µg/l	0.319						
2,4-Dinitrophenol	< 0.561	U	µg/l	0.561						
2-Methylphenol	< 0.665	U	µg/l	0.665						
3 & 4-Methylphenol	< 0.615	U	µg/l	0.615						
2-Nitrophenol	< 0.465	U	µg/l	0.465						
4-Nitrophenol	< 0.838	U	µg/l	0.838						
Pentachlorophenol	< 0.373	U	µg/l	0.373						
Phenol	< 0.645	U	µg/l	0.645						
2,4,5-Trichlorophenol	< 0.520	U	µg/l	0.520						
2,4,6-Trichlorophenol	< 0.518	U	µg/l	0.518						
Surrogate: 2-Fluorophenol	*26.1*		µg/l		*50.0*		*52*	*15-110*		
Surrogate: Phenol-d5	*26.7*		µg/l		*50.0*		*53*	*15-110*		
LCS (1711096-BS1)					Prepared: 30-Jun-17 Analyzed: 04-Jul-17					
4-Chloro-3-methylphenol	**28.2**		µg/l	0.501	50.0		56	30-130		
2-Chlorophenol	**28.5**		µg/l	0.748	50.0		57	30-130		
2,4-Dichlorophenol	**30.8**		µg/l	0.530	50.0		62	30-130		
2,4-Dimethylphenol	**26.8**		µg/l	0.653	50.0		54	30-130		
4,6-Dinitro-2-methylphenol	**30.7**		µg/l	0.319	50.0		61	30-130		
2,4-Dinitrophenol	**24.1**		µg/l	0.561	50.0		48	30-130		
2-Methylphenol	**31.3**		µg/l	0.665	50.0		63	30-130		
3 & 4-Methylphenol	**31.1**		µg/l	0.615	50.0		62	30-130		
2-Nitrophenol	**28.9**		µg/l	0.465	50.0		58	30-130		
4-Nitrophenol	**30.4**		µg/l	0.838	50.0		61	30-130		
Pentachlorophenol	**26.4**		µg/l	0.373	50.0		53	30-130		
Phenol	**28.0**		µg/l	0.645	50.0		56	30-130		
2,4,5-Trichlorophenol	**32.8**		µg/l	0.520	50.0		66	30-130		
2,4,6-Trichlorophenol	**28.8**		µg/l	0.518	50.0		58	30-130		
Surrogate: 2-Fluorophenol	*32.0*		µg/l		*50.0*		*64*	*15-110*		
Surrogate: Phenol-d5	*31.5*		µg/l		*50.0*		*63*	*15-110*		
LCS Dup (1711096-BSD1)					Prepared: 30-Jun-17 Analyzed: 04-Jul-17					
4-Chloro-3-methylphenol	**26.6**		µg/l	0.501	50.0		53	30-130	6	20
2-Chlorophenol	**28.5**		µg/l	0.748	50.0		57	30-130	0.3	20
2,4-Dichlorophenol	**29.1**		µg/l	0.530	50.0		58	30-130	6	20
2,4-Dimethylphenol	**25.2**		µg/l	0.653	50.0		50	30-130	6	20
4,6-Dinitro-2-methylphenol	**33.8**		µg/l	0.319	50.0		68	30-130	10	20
2,4-Dinitrophenol	**24.8**		µg/l	0.561	50.0		50	30-130	3	20
2-Methylphenol	**27.8**		µg/l	0.665	50.0		56	30-130	12	20
3 & 4-Methylphenol	**28.6**		µg/l	0.615	50.0		57	30-130	8	20
2-Nitrophenol	**27.7**		µg/l	0.465	50.0		55	30-130	4	20
4-Nitrophenol	**28.3**		µg/l	0.838	50.0		57	30-130	7	20
Pentachlorophenol	**24.7**		µg/l	0.373	50.0		49	30-130	7	20
Phenol	**26.3**		µg/l	0.645	50.0		53	30-130	6	20
2,4,5-Trichlorophenol	**31.2**		µg/l	0.520	50.0		62	30-130	5	20
2,4,6-Trichlorophenol	**28.1**		µg/l	0.518	50.0		56	30-130	2	20
Surrogate: 2-Fluorophenol	*29.6*		µg/l		*50.0*		*59*	*15-110*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 1711096 - SW846 3510C										
LCS Dup (1711096-BSD1)						Prepared: 30-Jun-17 Analyzed: 04-Jul-17				
Surrogate: Phenol-d5	*30.2*		µg/l		*50.0*		*60*	*15-110*		
SW846 8270D SIM										
Batch 1711096 - SW846 3510C										
Blank (1711096-BLK2)						Prepared: 30-Jun-17 Analyzed: 10-Jul-17				
Acenaphthene	< 0.050		µg/l	0.050						
Acenaphthylene	< 0.050		µg/l	0.050						
Anthracene	< 0.050		µg/l	0.050						
Benzo (a) anthracene	< 0.050		µg/l	0.050						
Benzo (a) pyrene	< 0.050		µg/l	0.050						
Benzo (b) fluoranthene	< 0.050		µg/l	0.050						
Benzo (g,h,i) perylene	< 0.050		µg/l	0.050						
Benzo (k) fluoranthene	< 0.050		µg/l	0.050						
Chrysene	< 0.050		µg/l	0.050						
Dibenzo (a,h) anthracene	< 0.050		µg/l	0.050						
Fluoranthene	< 0.050		µg/l	0.050						
Fluorene	< 0.050		µg/l	0.050						
Indeno (1,2,3-cd) pyrene	< 0.050		µg/l	0.050						
Naphthalene	< 0.050		µg/l	0.050						
Phenanthrene	< 0.050		µg/l	0.050						
Pyrene	< 0.050		µg/l	0.050						
Surrogate: Benzo (e) pyrene-d12	*1.05*		µg/l		*1.00*		*105*	*30-130*		
LCS (1711096-BS2)						Prepared: 30-Jun-17 Analyzed: 10-Jul-17				
Acenaphthene	**0.808**		µg/l	0.050	1.00		81	40-140		
Acenaphthylene	**0.886**		µg/l	0.050	1.00		89	40-140		
Anthracene	**0.686**		µg/l	0.050	1.00		69	40-140		
Benzo (a) anthracene	**0.847**		µg/l	0.050	1.00		85	40-140		
Benzo (a) pyrene	**0.798**		µg/l	0.050	1.00		80	40-140		
Benzo (b) fluoranthene	**0.838**		µg/l	0.050	1.00		84	40-140		
Benzo (g,h,i) perylene	**0.754**		µg/l	0.050	1.00		75	40-140		
Benzo (k) fluoranthene	**0.874**		µg/l	0.050	1.00		87	40-140		
Chrysene	**0.826**		µg/l	0.050	1.00		83	40-140		
Dibenzo (a,h) anthracene	**0.852**		µg/l	0.050	1.00		85	40-140		
Fluoranthene	**0.765**		µg/l	0.050	1.00		76	40-140		
Fluorene	**0.864**		µg/l	0.050	1.00		86	40-140		
Indeno (1,2,3-cd) pyrene	**0.787**		µg/l	0.050	1.00		79	40-140		
Naphthalene	**0.801**		µg/l	0.050	1.00		80	40-140		
Phenanthrene	**0.742**		µg/l	0.050	1.00		74	40-140		
Pyrene	**0.854**		µg/l	0.050	1.00		85	40-140		
Surrogate: Benzo (e) pyrene-d12	*0.910*		µg/l		*1.00*		*91*	*30-130*		
LCS Dup (1711096-BSD2)						Prepared: 30-Jun-17 Analyzed: 10-Jul-17				
Acenaphthene	**0.712**		µg/l	0.050	1.00		71	40-140	13	20
Acenaphthylene	**0.843**		µg/l	0.050	1.00		84	40-140	5	20
Anthracene	**0.651**		µg/l	0.050	1.00		65	40-140	5	20
Benzo (a) anthracene	**0.828**		µg/l	0.050	1.00		83	40-140	2	20
Benzo (a) pyrene	**0.793**		µg/l	0.050	1.00		79	40-140	0.6	20
Benzo (b) fluoranthene	**0.808**		µg/l	0.050	1.00		81	40-140	4	20
Benzo (g,h,i) perylene	**0.699**		µg/l	0.050	1.00		70	40-140	8	20
Benzo (k) fluoranthene	**0.866**		µg/l	0.050	1.00		87	40-140	0.9	20
Chrysene	**0.817**		µg/l	0.050	1.00		82	40-140	1	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D SIM										
Batch 1711096 - SW846 3510C										
LCS Dup (1711096-BSD2)					Prepared: 30-Jun-17 Analyzed: 10-Jul-17					
Dibenzo (a,h) anthracene	**0.823**		µg/l	0.050	1.00		82	40-140	3	20
Fluoranthene	**0.778**		µg/l	0.050	1.00		78	40-140	2	20
Fluorene	**0.808**		µg/l	0.050	1.00		81	40-140	7	20
Indeno (1,2,3-cd) pyrene	**0.722**		µg/l	0.050	1.00		72	40-140	9	20
Naphthalene	**0.776**		µg/l	0.050	1.00		78	40-140	3	20
Phenanthrene	**0.688**		µg/l	0.050	1.00		69	40-140	8	20
Pyrene	**0.782**		µg/l	0.050	1.00		78	40-140	9	20
Surrogate: Benzo (e) pyrene-d12	*0.900*		µg/l		*1.00*		*90*	*30-130*		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 200.8										
Batch 1712715 - EPA 200 Series										
Blank (1712715-BLK1)					Prepared & Analyzed: 25-Jul-17					
Lead	< 0.00002	U	mg/l	0.00002						
Cadmium	< 0.00004	U	mg/l	0.00004						
Nickel	< 0.00005	U	mg/l	0.00005						
Copper	**0.00019**	J	mg/l	0.00004						
LCS (1712715-BS1)					Prepared & Analyzed: 25-Jul-17					
Lead	**0.0447**		mg/l	0.00002	0.0500		89	85-115		
Cadmium	**0.0470**		mg/l	0.00004	0.0500		94	85-115		
Copper	**0.0530**	D	mg/l	0.00044	0.0500		106	85-115		
Nickel	**0.0476**		mg/l	0.00005	0.0500		95	85-115		
Duplicate (1712715-DUP1)			**Source: SC36391-01**		Prepared & Analyzed: 25-Jul-17					
Lead	**0.00156**	R01, D	mg/l	0.00012		0.00184			17	20
Copper	**0.296**	QR9, R01, D	mg/l	0.00044		0.194			42	20
Nickel	**0.0131**	QR9, R01, D	mg/l	0.00025		0.0166			24	20
Cadmium	< 0.00019	R01, U, D	mg/l	0.00019		0.00019				20
Matrix Spike (1712715-MS1)			**Source: SC36391-01**		Prepared & Analyzed: 25-Jul-17					
Lead	**0.0462**	D	mg/l	0.00024	0.0500	0.00184	89	70-130		
Cadmium	**0.0463**	D	mg/l	0.00037	0.0500	BRL	93	70-130		
Nickel	**0.0572**	D	mg/l	0.00050	0.0500	0.0166	81	70-130		
Copper	**0.346**	QM5, D	mg/l	0.00044	0.0500	0.194	304	70-130		
Post Spike (1712715-PS1)			**Source: SC36391-01**		Prepared & Analyzed: 25-Jul-17					
Lead	**0.0467**	D	mg/l	0.00024	0.0500	0.00184	90	85-115		
Cadmium	**0.0478**	D	mg/l	0.00037	0.0500	BRL	96	85-115		
Copper	**0.361**	QM5, D	mg/l	0.00044	0.0500	0.194	335	85-115		
Batch 1712781 - EPA 200 Series										
Blank (1712781-BLK1)					Prepared: 25-Jul-17 Analyzed: 26-Jul-17					
Zinc	< 0.00231	U	mg/l	0.00231						
LCS (1712781-BS1)					Prepared: 25-Jul-17 Analyzed: 26-Jul-17					
Zinc	**0.114**	D	mg/l	0.0231	0.100		114	85-115		
Duplicate (1712781-DUP1)			**Source: SC36391-01**		Prepared: 25-Jul-17 Analyzed: 26-Jul-17					
Zinc	**0.0218**	R01, J	mg/l	0.0116		0.0209			4	20
Matrix Spike (1712781-MS1)			**Source: SC36391-01**		Prepared: 25-Jul-17 Analyzed: 26-Jul-17					
Zinc	**0.535**	D	mg/l	0.116	0.500	BRL	107	70-130		
Post Spike (1712781-PS1)			**Source: SC36391-01**		Prepared: 25-Jul-17 Analyzed: 26-Jul-17					
Zinc	**0.529**	D	mg/l	0.116	0.500	BRL	106	85-115		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
ASTM D 1293-99B										
Batch 1710957 - General Preparation										
Reference (1710957-SRM1)						Prepared: 28-Jun-17 Analyzed: 29-Jun-17				
pH	**6.01**		pH Units		6.00		100	97.5-102.5		
Reference (1710957-SRM2)						Prepared: 28-Jun-17 Analyzed: 29-Jun-17				
pH	**6.00**		pH Units		6.00		100	97.5-102.5		
SM 2520 (01)										
Batch 1711426 - General Preparation										
Duplicate (1711426-DUP1)			**Source: SC36391-01**			Prepared & Analyzed: 06-Jul-17				
Salinity	**24.8**		ppt (1000)	1.00		24.6			0.7	10
Reference (1711426-SRM1)						Prepared & Analyzed: 06-Jul-17				
Salinity	**10.2**		ppt (1000)	1.00	10.0		102	90-110		
Reference (1711426-SRM2)						Prepared & Analyzed: 06-Jul-17				
Salinity	**10.1**		ppt (1000)	1.00	10.0		101	90-110		
SM2540 B (11)										
Batch 1711007 - General Preparation										
Blank (1711007-BLK1)						Prepared: 29-Jun-17 Analyzed: 05-Jul-17				
Total Solids	< 5.00		mg/l	5.00						
LCS (1711007-BS1)						Prepared: 29-Jun-17 Analyzed: 05-Jul-17				
Total Solids	**1120**		mg/l	10.0	1100		101	90-110		
Duplicate (1711007-DUP1)			**Source: SC36391-01**			Prepared: 29-Jun-17 Analyzed: 05-Jul-17				
Total Solids	**28100**		mg/l	100		29000			3	5
SM2540D (11)										
Batch 1711008 - General Preparation										
Blank (1711008-BLK1)						Prepared: 29-Jun-17 Analyzed: 30-Jun-17				
Total Suspended Solids	< 0.5		mg/l	0.5						
LCS (1711008-BS1)						Prepared: 29-Jun-17 Analyzed: 30-Jun-17				
Total Suspended Solids	**94.0**		mg/l	10.0	100		94	90-110		
SM4500-Cl-G (11)										
Batch 1711119 - General Preparation										
Blank (1711119-BLK1)						Prepared: 30-Jun-17 Analyzed: 05-Jul-17				
Total Residual Chlorine	< 0.020		mg/l	0.020						
LCS (1711119-BS1)						Prepared: 30-Jun-17 Analyzed: 05-Jul-17				
Total Residual Chlorine	**0.048**		mg/l	0.020	0.0500		95	90-110		
Reference (1711119-SRM1)						Prepared: 30-Jun-17 Analyzed: 05-Jul-17				
Total Residual Chlorine	**0.111**		mg/l	0.020	0.105		106	85-115		
SM5310B (00, 11)										
Batch 1711573 - General Preparation										
Blank (1711573-BLK1)						Prepared: 07-Jul-17 Analyzed: 08-Jul-17				
Total Organic Carbon	< 1.00		mg/l	1.00						
LCS (1711573-BS1)						Prepared: 07-Jul-17 Analyzed: 08-Jul-17				
Total Organic Carbon	**14.1**		mg/l	1.00	15.0		94	85-115		
Calibration Blank (1711573-CCB1)						Prepared & Analyzed: 07-Jul-17				
Total Organic Carbon	**0.0708**		mg/l							
Calibration Blank (1711573-CCB2)						Prepared & Analyzed: 07-Jul-17				
Total Organic Carbon	**0.124**		mg/l							
Calibration Blank (1711573-CCB3)						Prepared: 07-Jul-17 Analyzed: 08-Jul-17				
Total Organic Carbon	**0.136**		mg/l							

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SM5310B (00, 11)										
Batch 1711573 - General Preparation										
Calibration Blank (1711573-CCB4)						Prepared: 07-Jul-17 Analyzed: 08-Jul-17				
Total Organic Carbon	**0.110**		mg/l							
Calibration Blank (1711573-CCB5)						Prepared: 07-Jul-17 Analyzed: 08-Jul-17				
Total Organic Carbon	**0.104**		mg/l							
Calibration Check (1711573-CCV1)						Prepared & Analyzed: 07-Jul-17				
Total Organic Carbon	**14.3**		mg/l	1.00	15.0		95	85-115		
Calibration Check (1711573-CCV2)						Prepared & Analyzed: 07-Jul-17				
Total Organic Carbon	**14.4**		mg/l	1.00	15.0		96	85-115		
Calibration Check (1711573-CCV3)						Prepared & Analyzed: 07-Jul-17				
Total Organic Carbon	**14.0**		mg/l	1.00	15.0		93	85-115		
Calibration Check (1711573-CCV4)						Prepared: 07-Jul-17 Analyzed: 08-Jul-17				
Total Organic Carbon	**13.9**		mg/l	1.00	15.0		93	85-115		
Calibration Check (1711573-CCV5)						Prepared: 07-Jul-17 Analyzed: 08-Jul-17				
Total Organic Carbon	**14.2**		mg/l	1.00	15.0		95	85-115		
Reference (1711573-SRM1)						Prepared: 07-Jul-17 Analyzed: 08-Jul-17				
Total Organic Carbon	**8.45**		mg/l	1.00	9.42		90	85-115		

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
E350.1										
Batch 392124A - 392124										
BLK (BY50548-BLK)					Prepared: 30-Jun-17 Analyzed: 03-Jul-17					
Ammonia as Nitrogen	< 0.05		mg/L	0.05				-		
DUP (BY50548-DUP)			**Source: SC36391-01**		Prepared: 30-Jun-17 Analyzed: 03-Jul-17					
Ammonia as Nitrogen	**0.11**		mg/L	0.05				-	NC	20
LCS (BY50548-LCS)					Prepared: 30-Jun-17 Analyzed: 03-Jul-17					
Ammonia as Nitrogen	**3.980**		mg/L	0.05	3.74		106	90-110		20
MS (BY50548-MS)			**Source: SC36391-01**		Prepared: 30-Jun-17 Analyzed: 03-Jul-17					
Ammonia as Nitrogen	**2.230**		mg/L	0.05	2		107	90-110		20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW6020B										
Batch 394271A - 394271-										
BLK (BY63775-BLK)					Prepared: 18-Jul-17 Analyzed: 19-Jul-17					
Copper	< 0.010		mg/L	0.010				-		
Lead	< 0.001		mg/L	0.001				-		
Nickel	< 0.0010		mg/L	0.0010				-		
Chromium	< 0.0050		mg/L	0.0050				-		
Cadmium	< 0.0002		mg/L	0.0002				-		
DUP (BY63775-DUP)			**Source: BY63775**		Prepared: 18-Jul-17 Analyzed: 19-Jul-17					
Cadmium	< 0.0002		mg/L	0.0002				-	NC	20
Chromium	< 0.0050		mg/L	0.0050				-	NC	20
Copper	< 0.010		mg/L	0.010				-	NC	20
Lead	< 0.001		mg/L	0.001				-	NC	20
Nickel	**0.0035**		mg/L	0.0010				-	NC	20
LCS (BY63775-LCS)					Prepared: 18-Jul-17 Analyzed: 19-Jul-17					
Cadmium	**0.0494**		mg/L	0.0002	0.05		98.8	75-125		20
Nickel	**0.0537**		mg/L	0.0010	0.05		107	75-125		20
Lead	**0.0506**		mg/L	0.001	0.05		101	75-125		20
Chromium	**0.0514**		mg/L	0.0050	0.05		103	75-125		20
Copper	**0.0538**		mg/L	0.010	0.05		108	75-125		20
MS (BY63775-MS)			**Source: BY63775**		Prepared: 18-Jul-17 Analyzed: 19-Jul-17					
Chromium	**0.0542**		mg/L	0.0050	0.05		98.0	75-125		20
Copper	**0.0604**		mg/L	0.010	0.05		95.8	75-125		20
Cadmium	**0.0477**		mg/L	0.0002	0.05		95.4	75-125		20
Lead	**0.0468**		mg/L	0.001	0.05		93.6	75-125		20
Nickel	**0.0494**		mg/L	0.0010	0.05		88.8	75-125		20

Subcontracted Analyses - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
E1664A										
Batch 393336A - 393336										
BLK (BY50549-BLK)						Prepared & Analyzed: 12-Jul-17				
Oil and Grease by EPA 1664A	< 1.4		mg/L	1.4	40			-		
LCS (BY50549-LCS)						Prepared: Analyzed: 12-Jul-17				
Oil and Grease by EPA 1664A	**40.50**		mg/L	1.4	40		101	85-115		20

Notes and Definitions

D	Data reported from a dilution
J	Detected above the Method Detection Limit but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
O09	This sample was analyzed outside the EPA recommended holding time per client request.
QM5	The spike recovery was outside acceptance limits for the MS, MSD and/or PS due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QR5	RPD out of acceptance range.
QR9	RPD out of acceptance range. The batch is accepted based upon LCS and/or LCSD recovery.
R01	The Reporting Limit has been raised to account for matrix interference.
SDUP	Duplicate analysis confirmed surrogate failure due to matrix effects.
U	Analyte included in the analysis, but not detected at or above the MDL.
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference
ClHT	The method for residual chlorine indicates that samples should be analyzed immediately. 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous residual chlorine samples not analyzed in the field are considered out of hold time at the time of sample receipt.
OG	The required Matrix Spike and Matrix Spike Duplicate (MS/MSD) for Oil & Grease method 1664B can only be analyzed when the client has submitted sufficient sample volume. An extra liter per MS/MSD is required to fulfill the method QC criteria. Please refer to Chain of Custody and QC Summary (MS/MSD) of the Laboratory Report to verify ample sample volume was submitted to fulfill the requirement.
pH	The method for pH does not stipulate a specific holding time other than to state that the samples should be analyzed as soon as possible. For aqueous samples the 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous pH samples not analyzed in the field are considered out of hold time at the time of sample receipt. All soil samples are analyzed as soon as possible after sample receipt.
LIV	The initial volume for this sample has been reduced due to sample matrix and/or historical data therefore elevating the reporting limit.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.

New England Bioassay

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ACUTE AQUATIC TOXICITY TEST REPORT

Gulf Oil Terminal
Chelsea, MA

Test Start Date: 6/28/17

Test Period: June 2017

Report Prepared by:

New England Bioassay
A Division of GZA GeoEnvironmental, Inc.
77 Batson Dr.
Manchester, CT 06042

NEB Project Number: 05.0045469.00

Report Date: July 11, 2017

Report Submitted to:

Eurofins Spectrum Analytical, Inc.
11 Almgren Drive
Agawam, MA 01001

Sample ID: SC36391-01 / SC36392-01

Whole Effluent Toxicity Testing Report Instruction Form

Client Name/Project: Spectrum / Gulf Oil Terminal Test Date: 6/28/17

Sample ID: SC36391-01 / SC36392-01

Your results were as follows:

☒ Monitoring Only

□ Fail – Please proceed according to the instructions in your permit.

□ Invalid – **Retesting is still required. Retest report will be sent at a later date under separate cover.**

□ Original Test Invalid – **Valid retest performed. Both test and retest results are attached.**

□ Retesting will be or has been performed according to the Case 1 Protocols outlined in the attached copy of EPA-New England's species-specific, self-implementing policy for alternate dilution water.

□ This is your _____ case of dilution water toxicity. Please proceed according to the Case 2 Protocols outlined in the attached copy of EPA-New England's species-specific, self-implementing policy for alternate dilution water. The alternate dilution water you select for future tests for this species should be described as follows: "synthetic laboratory water made up according to EPA's toxicity test protocols, by adding specified amounts of salts into deionized water in order to match the hardness of our receiving water." Writing this letter should help you to avoid retests in the future.

□ Available information is insufficient to determine whether this test passed or failed. Please compare results to your permit limits. Please submit a current copy of your permit to the NEB Lab so that we can determine the status of future tests results and help ensure your compliance with permit requirements.

Please complete the items on this list before reporting these results according to the instructions in the "Monitoring and Reporting" Section of your permit.

- Please complete, sign and date the upper portion of the "Whole Effluent Toxicity Test Report Certification" page which is the page directly following this page.
- Fill in the Sample Type and Sample Method (upper right) and the Permit Limits (lower left) on the New England Bioassay - EPA Toxicity Test Summary Sheet(s) if they are incomplete.
- Fill in any missing information on the NEB Chain-of-Custody documents. This includes ensuring that the following information is recorded: Sampler's name and title, Facility name and address, Sample collection methods, Sample collection start and end dates and times, Types of sample, Chlorination status of samples upon shipment to NEB, Site description and Sample collection procedures.
- Monitoring results should be summarized on your monthly Discharge Monitoring Report Form.
- Signed and dated originals of this report must be submitted to the State (and Federal) Agencies specified in the "Monitoring and Reporting" section of your permit.

Questions? Please contact the Lab Manager, Kim Wills, at (860) 858-3153 or kimberly.wills@gza.com.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Permittee)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on _____ _____
[Date] [Authorized Signature]

_____
[Print or Type Name and Title]

_____
[Print or Type the Permittee's Name]

_____
[Print or Type the NPDES Permit No.]

Since the WET test and report check is complicated, the New England Bioassay Aquatic Toxicity Laboratory has certified the validity of the WET test data in the section below. Please note that this does not relieve the permittee from its responsibility to sign and certify the report under 40 C.F.R. S 122.41(k).

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on 7/11/17 _____
[Date] [Authorized Signature]

Kim Wills, Laboratory Manager
[Print or Type Name and Title]

New England Bioassay
[Print or Type Name of Bioassay Laboratory]

24. Telephone Contacts
If you have questions, please contact Joy Hilton, Water Technical Unit, at (617) 918-1877 or David McDonald, Ecosystem Assessment Unit, at (617) 918-8609.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Gulf Oil Terminal Test Start Date: 6/28/17
NPDES Permit Number: MA0001091 Outfall Number: 003

Test Type	Test Species	Sample Type	Sample Method
X Acute	_ Fathead Minnow	_ Prechlorinated	X Grab
_ Chronic	_ Ceriodaphnia Dubia	_ Dechlorinated	_ Composite
_ Modified	_ Daphnia Pulex	_ Unchlorinated	_ Flow-thru
(Chronic reporting	X Mysid Shrimp	_ Chlorinated	_ Other
LC50 values)	_ Sheepshead		
_ 24-Hour Screening	_ Menidia		
	_ Sea Urchin	TRC conc. 0.125 mg/L	
	_ Selenastrum		
	_ Other		

Dilution Water

X Receiving water collected at a point immediately upstream of or away from the discharge;
(Receiving water name and sampling location: Chelsea River)
_ Alternate Surface Water of known quality and a hardness to generally reflect the characteristics of the receiving water; (Surface water name:)
_ Synthetic water prepared using either Millipore Mill-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water;
_ Artificial sea salts mixed with deionized water;
_ Other

Effluent Sampling Date(s): 6/27/17

Effluent Concentrations Tested (in%): 0 6.25 12.5 25 50 100
* (Permit Limit Concentration): monitoring only

Was effluent salinity adjusted? Yes If yes, to what value? 25 ppt

Reference Toxicant test date: 6/1/17 Reference Toxicant Test Acceptable: Yes X No _

Age and Age Range of Test Organisms 3 days (< 24 hours) Source of Organisms NEB

TEST RESULTS &PERMIT LIMITS

Test Acceptability Criteria

A. Synthetic Water Control
Mean Control Survival: 100% Mean Control Reproduction: N/A
Mean Control Weight: N/A Mean Control % Fertilization: N/A

B. Receiving Water Control
Mean Control Survival: 100% Mean Control Reproduction: N/A
Mean Control Weight: N/A Mean Control % Fertilization: N/A

C. Lab Culture Control Yes_ No X

D. Thiosulfate Control Yes_ No X

Test Variability

Test PMSD (growth) N/A
Test PMSD (reproduction.) N/A

Permit Limits & Test Results

	Limits		Results
LC50	N/A	LC50	>100%
		Upper Value	±∞
		Lower Value	100%
		Data Analysis Method Used	Graphical
A-NOEC	N/A	A-NOEC	100%
C-NOEC	N/A	C-NOEC	N/A
		LOEC	N/A
IC25	N/A	IC25	-------
IC50	N/A	IC50	-------

PMSD Comparison Discussion – N/A

Concentration-Response Evaluation

The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of "Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000:

X 1. Ideal concentration-response relationship
_ 2. All or nothing response
_ 3. Stimulatory response at low concentrations and detrimental effects at higher concentrations
_ 4. Stimulation at low concentrations but no significant effect at higher concentrations
_ 5. Interrupted concentration-response: significant effects bracketed by non-significant effects
_ 6. Interrupted concentration-response: non-significant effects bracketed by significant effects
_ 7. Significant effects only at highest concentration
_ 8. Significant effects at all test concentrations but flat concentration-response curve
_ 9. Significant effects at all test concentrations with a sloped concentration-response curve
_ 10. Inverse concentration-response relationship

The concentration-response relationship was reviewed according to the above guidance document and the following determination was made:

X 1. Results are reliable and should be reported.
_ 2. Results are anomalous. An explanation is provided in the body of the report.
_ 3. Results are inconclusive and the test should be repeated with a newly collected sample. An explanation is provided in the body of the report.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Gulf Oil Terminal Test Start Date: 6/28/17
NPDES Permit Number: MA0001091 Outfall Number: 003

Test Type	Test Species	Sample Type	Sample Method
X Acute	_ Fathead Minnow	_ Prechlorinated	X Grab
_ Chronic	_ Ceriodaphnia Dubia	_ Dechlorinated	_ Composite
_ Modified	_ Daphnia Pulex	_ Unchlorinated	_ Flow-thru
(Chronic reporting	_ Mysid Shrimp	_ Chlorinated	_ Other
LC50 values)	_ Sheepshead		
_ 24-Hour Screening	X Menidia		
	_ Sea Urchin	TRC conc. 0.125 mg/L	
	_ Selenastrum		
	_Other		

Dilution Water

X Receiving water collected at a point immediately upstream of or away from the discharge;
(Receiving water name and sampling location: Chelsea River)
_ Alternate Surface Water of known quality and a hardness to generally reflect the characteristics of the receiving water; (Surface water name:)
_ Synthetic water prepared using either Millipore Mill-Q or equivalent deionized water and reagent grade chemicals; or deionized water combined with mineral water;
_ Artificial sea salts mixed with deionized water;
_ Other

Effluent Sampling Date(s): 6/27/17

Effluent Concentrations Tested (in%): 0 6.25 12.5 25 50 100
* (Permit Limit Concentration): monitoring only

Was effluent salinity adjusted? Yes If yes, to what value? 25 ppt

Reference Toxicant test date: 6/1/17 Reference Toxicant Test Acceptable: Yes X No _

Age and Age Range of Test Organisms 10 days (<24 hours) Source of Organisms A.I.

TEST RESULTS &PERMIT LIMITS

Test Acceptability Criteria

A. Synthetic Water Control
Mean Control Survival: 97.5% Mean Control Reproduction: N/A
Mean Control Weight: N/A Mean Control % Fertilization: N/A

B. Receiving Water Control
Mean Control Survival: 100% Mean Control Reproduction: N/A
Mean Control Weight: N/A Mean Control % Fertilization: N/A

C. Lab Culture Control Yes_ No X

D. Thiosulfate Control Yes_ No X

Test Variability

Test PMSD (growth) N/A
Test PMSD (reproduction.) N/A

Permit Limits & Test Results

	Limits		Results
LC50	N/A	LC50	>100%
		Upper Value	±∞
		Lower Value	100%
		Data Analysis Method Used	Graphical
A-NOEC	N/A	A-NOEC	100%
C-NOEC	N/A	C-NOEC	N/A
		LOEC	N/A
IC25	N/A	IC25	-------
IC50	N/A	IC50	-------

PMSD Comparison Discussion – N/A

Concentration-Response Evaluation

The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of "Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000:

X 1. Ideal concentration-response relationship
_ 2. All or nothing response
_ 3. Stimulatory response at low concentrations and detrimental effects at higher concentrations
_ 4. Stimulation at low concentrations but no significant effect at higher concentrations
_ 5. Interrupted concentration-response: significant effects bracketed by non-significant effects
_ 6. Interrupted concentration-response: non-significant effects bracketed by significant effects
_ 7. Significant effects only at highest concentration
_ 8. Significant effects at all test concentrations but flat concentration-response curve
_ 9. Significant effects at all test concentrations with a sloped concentration-response curve
_ 10. Inverse concentration-response relationship

The concentration-response relationship was reviewed according to the above guidance document and the following determination was made:

X 1. Results are reliable and should be reported.
_ 2. Results are anomalous. An explanation is provided in the body of the report.
_ 3. Results are inconclusive and the test should be repeated with a newly collected sample. An explanation is provided in the body of the report.

MYSIDOPSIS BAHIA AQUATIC TOXICITY TEST REPORT

Test Reference Manual:	EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater Organisms and Marine Organisms", Fifth Edition
Test Method:	*Mysidopsis bahia* Acute Toxicity Test – Method 2007.0
Test Type:	Acute Static Non-Renewal Saltwater Test
Salinity:	25 ppt ± 10% for all dilutions by dry ocean salts (Instant Ocean)
Temperature :	25 ± 1°C
Light Quality:	Ambient Laboratory Illumination
Photoperiod:	16 hours light, 8 hours dark
Test Chamber Size:	250 mL
Test Solution Volume:	Minimum 200 mL
Age of Test Organisms:	3 days
Number of Mysids Per Test Chamber:	10
Number of Replicate Test Chambers Per Treatment:	4
Total Number of Mysids Per Test Concentration:	40
Feeding Regime:	Light feeding using concentrated *Artemia* nauplii while holding prior to initiating the test.
Aeration:	Aerated at <100 bubbles/minute
Dilution Water:	Chelsea River
Alternate Control Water:	NEB Artificial Salt Water (salinity 25 ± 1 ppt)
Effluent Concentrations:	0%, 6.25%, 12.5%, 25%, 50% and 100% effluent
Test Duration:	48 hours
Effect measured:	Mortality – no movement of body appendages on gentle prodding
Test Acceptability:	≥ 90% survival of test organisms in control solution Yes X No _
Sampling Requirements:	Samples first used within 36 hours of collection Yes X No _
Sample Volume Required:	Minimum 2 liters
Test Organism Source:	New England Bioassay
Test Acceptability Criteria:	Mean Alternate Water Control Survival = 100% Mean Dilution Water Control Survival = 100%

Test Results:

	Limits	Results
48-hour LC50	N/A	>100%
Upper Value		±∞
Lower Value		100%
Data Analysis Method Used		Graphical
A-NOEC		100%

Reference Toxicant Data:

Date:	6/1/17
Toxicant:	Sodium Dodecyl Sulfate
Dilution Water:	NEB Artificial Salt Water
Toxicant Source:	New England Bioassay
Organism Source:	New England Bioassay
48-hour LC50:	17.7 mg/L
In Acceptable Range:	Yes X No

Dechlorination Procedures: Chlorine is measured using 4500 CL-G DPD Colorimetric Method.

X Dechlorination was not required.

_ Sample was dechlorinated by adding sodium thiosulfate to the sample prior to test initiation. Since dechlorination of the effluent was necessary, a thiosulfate control of diluent water spiked with sodium thiosulfate was also included in the test series. Chlorine was _____ mg/L in a dechlorinated sample.

_ Chlorine measurement was elevated in the effluent due to interference. Chlorine was <0.05 mg/ L when measured by amperometric titration.

_ Total Residual Chlorine was re-measured following aeration, and was found to be _____ mg/L.

Additional Notes or Other Conditions Affecting the Test:

MENIDIA BERYLLINA AQUATIC TOXICITY TEST REPORT

Test Reference Manual:	EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater Organisms and Marine Organisms", Fifth Edition
Test Method:	*Menidia beryllina* Acute Toxicity Test – Method 2006.0
Test Type:	Acute Static Non-Renewal Saltwater Test
Salinity:	25 ppt ± 2 ppt by adding dry ocean salts (Instant Ocean)
Temperature :	25 ± 1°C
Light Quality:	Ambient Laboratory Illumination
Photoperiod:	16 hours light, 8 hours dark
Test Chamber Size:	250 mL
Test Solution Volume:	Minimum 200 mL/replicate
Age of Test Organisms:	10 days old (24 hour age range)
Number of Fish Per Test Chamber:	10
Number of Replicate Test Chambers Per Treatment:	4
Total Number of Organisms Per Test Concentration:	40
Feeding Regime:	Light feeding using concentrated *Artemia* nauplii while holding prior to initiating the test.
Aeration:	Aerated at <100 bubbles/minute
Dilution Water:	Chelsea River
Alternate Control Water:	NEB Artificial Salt Water (salinity 25 ± 1 ppt)
Effluent Concentrations:	0%, 6.25%, 12.5%, 25%, 50% and 100% effluent
Test Duration:	48 hours
Effect measured:	Mortality – no movement on gentle prodding.
Test Acceptability:	≥ 90% survival of test organisms in control solution Yes X No _
Sampling Requirements:	Samples first used within 36 hours of collection Yes X No _
Sample Volume Required:	Minimum 2 liters
Test Organism Source:	Aquatic Biosystems
Test Acceptability Criteria:	Mean Alternate Water Control Survival = 97.5% Mean Dilution Water Control Survival = 100%

Test Results:

	Limits	Results
48-hour LC50	N/A	>100%
Upper Value		± ∞
Lower Value		100%
Data Analysis Method Used		Graphical
A-NOEC		100%

Reference Toxicant Data:

Date:	6/1/17
Toxicant:	Sodium Dodecyl Sulfate
Dilution Water:	NEB Artificial Salt Water
Toxicant Source:	New England Bioassay
Organism Source:	Aquatic Biosystems
48-hour LC50:	7.78 mg/L
In Acceptable Range:	Yes X No _____

Dechlorination Procedures: Chlorine is measured using 4500 CL-G DPD Colorimetric Method.

X Dechlorination was not required.

_ Sample was dechlorinated by adding sodium thiosulfate to the sample prior to test initiation. Since dechlorination of the effluent was necessary, a thiosulfate control of diluent water spiked with sodium thiosulfate was also included in the test series. Chlorine was _____ mg/L in a dechlorinated sample.

_ Chlorine measurement was elevated in the effluent due to interference. Chlorine was <0.05 mg/L when measured by amperometric titration.

_ Total Residual Chlorine was re-measured following aeration, and was found to be _____ mg/L.

Additional Notes or Other Conditions Affecting the Test:

NEW ENGLAND BIOASSAY ACUTE TOXICITY DATA FORM
COVER SHEET FOR LC50 TESTS

CLIENT:	Eurofins Spectrum Analytical	*M.bahia* TEST ID #	17-936a
ADDRESS:	11 Almgren Drive	*M.beryllina* TEST ID #	17-936b
	Agawam, MA 01001	COC #	c37-2569
SAMPLE TYPE:	Gulf Oil Terminal Outfall 003	PROJECT #	05.0045469.00
DILUTION WATER:	Chelsea River		

Sample Date(s): 6/27/17 Received On: 6/28/17

INVERTEBRATES

TEST SET UP (TECH INIT)	KO
TEST SPECIES	*Mysidopsis bahia*
NEB LOT#	Mb17(6-25)
AGE	3 days
TEST SOLUTION VOLUME (mls)	200
NO. ORGANISMS PER TEST CHAMBER	10
NO. ORGANISMS PER CONCENTRATION	40
NO. ORGANISMS PER CONTROL	40

	DATE	TIME
TEST START:	6/28/17	1610
TEST END:	6/30/17	1555

VERTEBRATES

TEST SET UP (TECH INIT)	KW
TEST SPECIES	*Menidia beryllina*
NEB LOT#	Ss17AI(6-27)
AGE	10 days
TEST SOLUTION VOLUME (mls)	700
NO. ORGANISMS PER TEST CHAMBER	10
NO. ORGANISMS PER CONCENTRATION	40
NO. ORGANISMS PER CONTROL	40

	DATE	TIME
TEST START:	6/28/17	1604
TEST END:	6/30/17	1605

LABORATORY CONTROL WATER:

			Salinity (ppt)	Alkalinity (mg/L $CaCO_3$)
ARTIFICIAL SW:	NEB BATCH#	CRI037-22	25	125

RESULTS OF *Mysidopsis bahia* LC50 TEST

METHOD	LC50 (%)	95% Confidence Limits
BINOMIAL/GRAPHICAL	>100%	100%±∞
PROBIT		
SPEARMAN KARBER		
NOAEL	100%	

RESULTS OF *Menidia beryllina* LC50 TEST

METHOD	LC50 (%)	95% Confidence Limits
BINOMIAL/GRAPHICAL	>100%	100%±∞
PROBIT		
SPEARMAN KARBER		
NOAEL	100%	

NOEC: NO OBSERVABLE EFFECT CONCENTRATION

Comments: *Added 269.1g of IO to 9L of effluent to bring salinity to 25ppt CB 6/28/17

REVIEWD BY: DATE: 7/11/17

NEW ENGLAND BIOASSAY
Toxicity Test Data Sheet

NEB Test #: 17-936a
Project #: 05.0045469.00
Facility Name: Gulf Oil Terminal
Date Sampled: 6/27/17
Date Received: 6/28/17
Sample ID: Outfall 003

Test Organism: *Mysidopsis bahia*
Organism Age: 3 days
Test Duration: 48 (hours)
Beginning Date: 6/28/17 Time: 1610
Dilution Water Source: Chelsea River
Salinity: 27 ppt

Effluent Conc. %	Number of Surviving Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			pH (su)			Salinity (ppt)		
Initials	0	TBP	KO	KO	TBP	PD	KO	TBP	PD	KO	TBP	PD	KO	TBP	PD
	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control A	10	10	10	7.6	5.8	4.7	24.0	25.4	25.2	7.8	7.9	7.7	25	25	25
Control B	10	10	10		5.3	4.0		25.7	25.3		7.9	7.6		25	25
Control C	10	10	10		5.4	3.8		25.6	25.5		7.9	7.6		25	25
Control D	10	10	10		5.2	3.8		25.7	25.3		7.9	7.6		25	25
Diluent A	10	10	10	7.8	5.4	3.8	24.0	25.6	25.4	7.8	7.7	7.4	27	27	27
Diluent B	10	10	10		4.9	3.6		25.6	25.5		7.6	7.4		27	27
Diluent C	10	10	10		4.9	3.3		25.7	25.5		7.6	7.4		27	27
Diluent D	10	10	10		4.9	3.7		25.8	25.5		7.6	7.4		27	27
6.25 A	10	10	10	7.9	5.4	4.2	24.3	25.6	25.4	7.7	7.7	7.5	27	27	27
6.25 B	10	10	10		4.9	3.8		25.7	25.5		7.7	7.4		27	27
6.25 C	10	10	10		4.8	3.5		25.6	25.5		7.6	7.4		27	27
6.25 D	10	10	10		4.8	3.4		25.6	25.6		7.6	7.4		27	27
12.5 A	10	10	10	7.8	5.1	3.4	24.3	25.6	25.6	7.7	7.7	7.4	26	27	27
12.5 B	10	10	10		5.0	3.3		25.5	25.5		7.7	7.4		27	27
12.5 C	10	10	10		5.0	3.9		25.5	25.4		7.7	7.5		27	27
12.5 D	10	10	10		4.9	3.4		25.6	25.6		7.6	7.4		26	27
25 A	10	10	10	7.6	5.7	4.6	24.2	25.5	25.3	7.8	7.8	7.6	26	27	27
25 B	10	10	10		5.9	4.6		25.6	25.2		7.8	7.6		26	27
25 C	10	10	10		4.9	3.8		25.6	25.3		7.7	7.5		26	27
25 D	10	10	10		5.0	3.8		25.7	25.5		7.7	7.5		26	27

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

NEW ENGLAND BIOASSAY
Toxicity Test Data Sheet

NEB Test #: 17-936a
Project #: 05.0045469.00
Facility Name: Gulf Oil Terminal
Date Sampled: 6/27/17
Date Received: 6/28/17
Sample ID: Outfall 003

Test Organism: *Mysidopsis bahia*
Organism Age: 3 days
Test Duration: 48 (hours)
Beginning Date: 6/28/17 Time: 1610
Dilution Water Source: Chelsea River
Salinity: 27 ppt

Effluent Conc. %	Number of Surviving Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			pH (su)			Salinity (ppt)		
Initials	0	TBP	KO	KO	TBP	PD	KO	TBP	PD	KO	TBP	PD	KO	TBP	PD
	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
50 A	10	10	10	7.7	5.8	4.7	24.2	25.6	25.3	7.8	7.9	7.7	26	26	26
50 B	10	10	10		4.7	3.8		25.6	25.3		7.8	7.7		26	26
50 C	10	10	10		5.2	3.9		25.5	25.3		7.9	7.7		26	26
50 D	10	10	10		5.2	3.9		25.7	25.5		7.9	7.7		26	26
100 A	10	10	10	7.4	5.7	4.6	24.2	25.6	25.4	7.9	8.0	7.9	25	25	26
100 B	10	10	10		4.1	3.4		25.7	25.5		7.9	7.8		25	25
100 C	10	10	10		5.1	3.8		25.6	25.4		8.0	7.9		25	25
100 D	10	10	10		5.3	4.2		25.7	25.5		8.0	7.9		25	26

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

Mysidopsis 96-h Acute Survival Test — **New England Bioassay**

Analysis ID:	07-1362-1656	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	11 Jul-17 10:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-8602-9855	**Test Type:**	Survival (48h)	**Analyst:**	
Start Date:	28 Jun-17 16:10	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Receiving Water
Ending Date:	30 Jun-17 15:55	**Species:**	Mysidopsis bahia	**Brine:**	
Duration:	48h	**Source:**	In-House Culture	**Age:**	3d
Sample ID:	03-0879-0757	**Code:**	1267C5E5	**Client:**	Spectrum Analytical
Sample Date:	27 Jun-17 10:00	**Material:**	Not Applicable	**Project:**	
Receipt Date:	28 Jun-17	**Source:**	Gulf Oil Terminal (MA0001091)		
Sample Age:	30h	**Station:**			

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X)	Linear	2115718	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC50	>100	n/a	n/a	<1	n/a	n/a

48h Survival Rate Summary — Calculated Variate(A/B)

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	D	4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40
6.25		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40
12.5		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40
25		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40
50		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40
100		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40

48h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

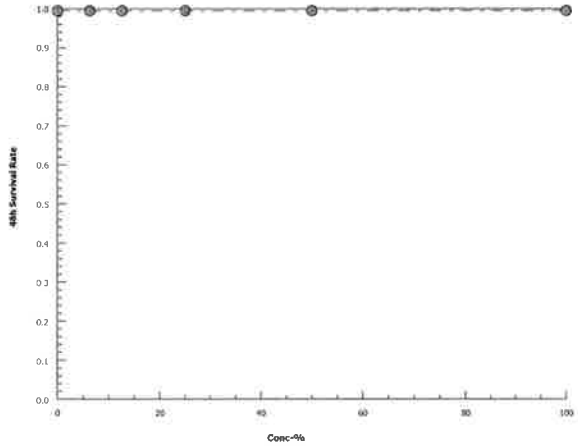
48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	10/10
50		10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

Mysidopsis 96-h Acute Survival Test **New England Bioassay**

Analysis ID:	07-1362-1656	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	11 Jul-17 10:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Mysidopsis 96-h Acute Survival Test — **New England Bioassay**

Analysis ID:	08-2671-9310	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	11 Jul-17 10:38	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	12-8602-9855	**Test Type:**	Survival (48h)	**Analyst:**	
Start Date:	28 Jun-17 16:10	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Receiving Water
Ending Date:	30 Jun-17 15:55	**Species:**	Mysidopsis bahia	**Brine:**	
Duration:	48h	**Source:**	In-House Culture	**Age:**	3d
Sample ID:	03-0879-0757	**Code:**	1267C5E5	**Client:**	Spectrum Analytical
Sample Date:	27 Jun-17 10:00	**Material:**	Not Applicable	**Project:**	
Receipt Date:	28 Jun-17	**Source:**	Gulf Oil Terminal (MA0001091)		
Sample Age:	30h	**Station:**			

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C > T	100	> 100	n/a	1

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		12.5	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		25	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		50	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		100	18	10	1	6	Asymp	0.8333	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	5	65540	<1.0E-37	Significant Effect
Error	0	0	18			
Total	0		23			

48h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
6.25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
12.5		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
50		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
100		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%

48h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

Mysidopsis 96-h Acute Survival Test — **New England Bioassay**

Analysis ID:	08-2671-9310	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	11 Jul-17 10:38	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

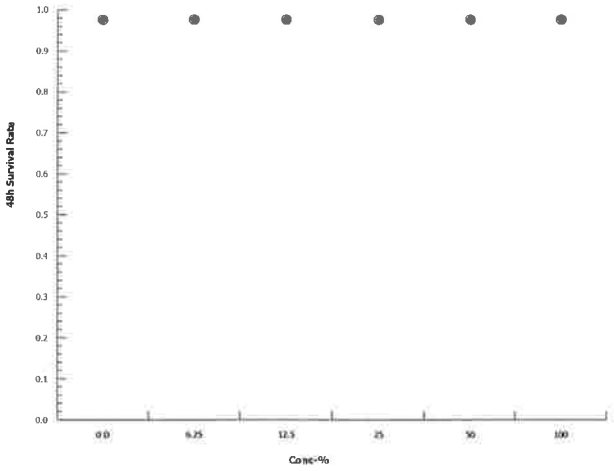
Angular (Corrected) Transformed Detail

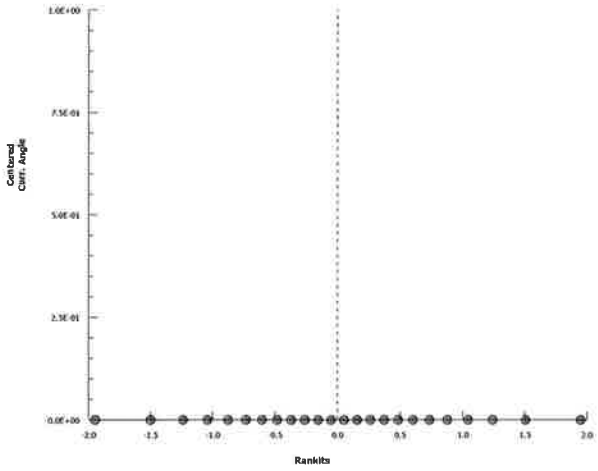
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.412	1.412	1.412	1.412
6.25		1.412	1.412	1.412	1.412
12.5		1.412	1.412	1.412	1.412
25		1.412	1.412	1.412	1.412
50		1.412	1.412	1.412	1.412
100		1.412	1.412	1.412	1.412

48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	10/10
50		10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

Graphics





NEW ENGLAND BIOASSAY
Toxicity Test Data Sheet

NEB Test #: 17-936b
Project #: 05.0045469.00
Facility Name: Gulf Oil Terminal
Date Sampled: 6/27/17
Date Received: 6/28/17
Sample ID: Outfall 003

Test Organism: *Menidia beryllina*
Organism Age: 10 days
Test Duration: 48 (hours)
Beginning Date: 6/28/17 Time: 1604
Dilution Water Source: Chelsea River
Salinity: 27 ppt

Effluent Conc. %	Number of Surviving Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			pH (su)			Salinity (ppt)		
Initials	0	TBP	KO	KO	TBP	PD	KO	TBP	PD	KO	TBP	PD	KO	TBP	PD
	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control A	10	9	9	7.6	5.7	5.1	24.0	25.4	25.7	7.8	8.0	7.8	25	25	25
Control B	10	10	10		5.8	4.9		25.3	25.7		8.0	7.8		25	25
Control C	10	10	10		5.9	4.9		25.2	25.7		8.0	7.8		25	25
Control D	10	10	10		5.9	4.9		25.4	25.7		8.0	7.8		25	25
Diluent A	10	10	10	7.8	5.7	4.8	24.0	25.4	25.7	7.8	7.7	7.6	27	26	27
Diluent B	10	10	10		5.6	5.0		25.4	25.5		7.7	7.6		27	27
Diluent C	10	10	10		5.9	5.2		25.3	25.4		7.7	7.7		27	27
Diluent D	10	10	10		5.8	5.0		25.4	25.5		7.7	7.6		27	27
6.25 A	10	10	10	7.9	5.6	5.1	24.3	25.5	25.7	7.7	7.7	7.7	27	26	26
6.25 B	10	10	10		5.5	5.0		25.5	25.7		7.7	7.7		26	26
6.25 C	10	10	10		5.5	4.9		25.5	25.6		7.7	7.7		26	27
6.25 D	10	10	10		5.6	4.6		25.4	25.7		7.7	7.6		27	27
12.5 A	10	10	10	7.8	5.5	5.2	24.3	25.6	25.7	7.7	7.7	7.7	26	26	26
12.5 B	10	10	10		5.5	5.1		25.6	25.6		7.7	7.7		26	26
12.5 C	10	10	10		5.4	5.2		25.5	25.6		7.7	7.7		26	26
12.5 D	10	10	10		5.3	4.8		25.5	25.6		7.7	7.7		26	26
25 A	10	9	9	7.6	5.6	5.5	24.2	25.4	25.4	7.8	7.8	7.7	26	26	26
25 B	10	8	8		5.6	5.2		25.4	25.5		7.8	7.8		26	26
25 C	10	10	10		5.7	5.2		25.4	25.5		7.8	7.8		26	26
25 D	10	9	9		5.2	4.9		25.5	25.5		7.8	7.7		26	26

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

NEW ENGLAND BIOASSAY
Toxicity Test Data Sheet

NEB Test #: 17-936b
Project #: 05.0045469.00
Facility Name: Gulf Oil Terminal
Date Sampled: 6/27/17
Date Received: 6/28/17
Sample ID: Outfall 003

Test Organism: *Menidia beryllina*
Organism Age: 10 days
Test Duration: 48 (hours)
Beginning Date: 6/28/17 Time: 1604
Dilution Water Source: Chelsea River
Salinity: 27 ppt

Effluent Conc. %	Number of Surviving Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			pH (su)			Salinity (ppt)		
Initials	0	TBP	KO	KO	TBP	PD	KO	TBP	PD	KO	TBP	PD	KO	TBP	PD
	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
50 A	10	10	9	7.7	5.7	5.2	24.2	25.3	25.4	7.8	7.9	7.9	26	26	26
50 B	10	10	10		5.6	4.9		25.3	25.4		7.9	7.8		26	26
50 C	10	10	10		5.3	5.0		25.4	25.4		7.8	7.8		26	26
50 D	10	10	10		5.2	4.9		25.5	25.5		7.8	7.8		26	26
100 A	10	10	10	7.4	5.5	5.1	24.2	25.2	25.4	7.9	8.0	8.0	25	25	25
100 B	10	10	10		5.4	5.2		25.3	25.3		8.0	8.0		25	25
100 C	10	10	10		5.4	5.3		25.3	25.3		8.0	8.0		25	25
100 D	10	10	10		5.5	5.3		25.3	25.3		8.0	8.0		25	25

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

Inland Silverside 96-h Acute Survival Test — **New England Bioassay**

Analysis ID:	00-5413-7171	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	11 Jul-17 10:39	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	16-6034-2378	**Test Type:**	Survival (48h)	**Analyst:**	
Start Date:	28 Jun-17 16:04	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Receiving Water
Ending Date:	30 Jun-17 16:05	**Species:**	Menidia beryllina	**Brine:**	
Duration:	48h	**Source:**	In-House Culture	**Age:**	10d
Sample ID:	10-6666-1888	**Code:**	3F93F800	**Client:**	Spectrum Analytical
Sample Date:	27 Jun-17 10:00	**Material:**	Not Applicable	**Project:**	
Receipt Date:	28 Jun-17	**Source:**	Gulf Oil Terminal (MA0001091)		
Sample Age:	30h	**Station:**			

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	6.72%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		12.5	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		25	12	10	1	6	Asymp	0.1424	Non-Significant Effect
		50	16	10	1	6	Asymp	0.6105	Non-Significant Effect
		100	18	10	1	6	Asymp	0.8333	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.079866	0.0159732	5	4.323	0.0093	Significant Effect
Error	0.0665026	0.0036946	18			
Total	0.146369		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.608	4.248	0.0195	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.723	4.248	0.1804	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6571	0.884	2.9E-06	Non-Normal Distribution

48h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		4	0.9000	0.7701	1.0000	0.9000	0.8000	1.0000	0.0408	9.07%	10.00%
50		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	2.50%
100		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
6.25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
12.5		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
25		4	1.254	1.056	1.453	1.249	1.107	1.412	0.06231	9.93%	11.17%
50		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%
100		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%

Inland Silverside 96-h Acute Survival Test — **New England Bioassay**

Analysis ID:	00-5413-7171	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	11 Jul-17 10:39	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

48h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		0.9000	0.8000	1.0000	0.9000
50		0.9000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

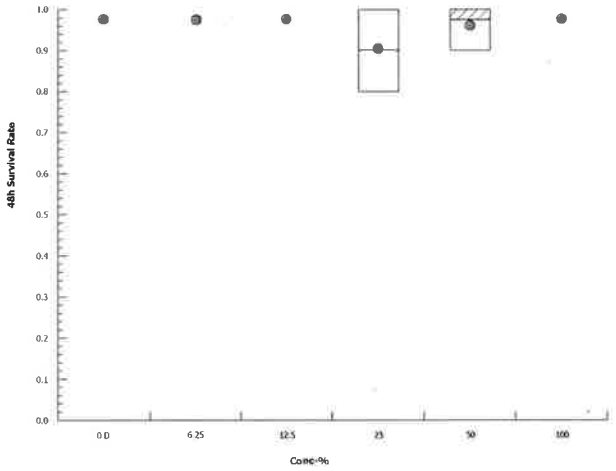
Angular (Corrected) Transformed Detail

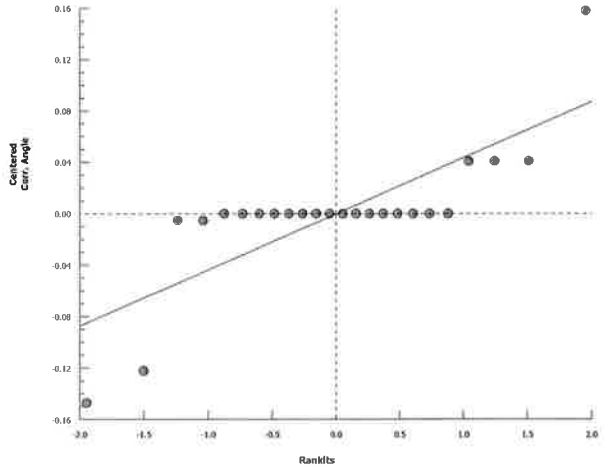
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.412	1.412	1.412	1.412
6.25		1.412	1.412	1.412	1.412
12.5		1.412	1.412	1.412	1.412
25		1.249	1.107	1.412	1.249
50		1.249	1.412	1.412	1.412
100		1.412	1.412	1.412	1.412

48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		9/10	8/10	10/10	9/10
50		9/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

Graphics





Inland Silverside 96-h Acute Survival Test — **New England Bioassay**

Analysis ID:	17-5418-9503	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	11 Jul-17 10:39	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-6034-2378	**Test Type:**	Survival (48h)	**Analyst:**	
Start Date:	28 Jun-17 16:04	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Receiving Water
Ending Date:	30 Jun-17 16:05	**Species:**	Menidia beryllina	**Brine:**	
Duration:	48h	**Source:**	In-House Culture	**Age:**	10d
Sample ID:	10-6666-1888	**Code:**	3F93F800	**Client:**	Spectrum Analytical
Sample Date:	27 Jun-17 10:00	**Material:**	Not Applicable	**Project:**	
Receipt Date:	28 Jun-17	**Source:**	Gulf Oil Terminal (MA0001091)		
Sample Age:	30h	**Station:**			

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X)	Linear	1624003	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC50	>100	n/a	n/a	<1	n/a	n/a

48h Survival Rate Summary — Calculated Variate(A/B)

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	D	4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40
6.25		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40
12.5		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40
25		4	0.9000	0.8000	1.0000	0.0408	0.0817	9.07%	10.0%	36	40
50		4	0.9750	0.9000	1.0000	0.0250	0.0500	5.13%	2.5%	39	40
100		4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	40	40

48h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		0.9000	0.8000	1.0000	0.9000
50		0.9000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

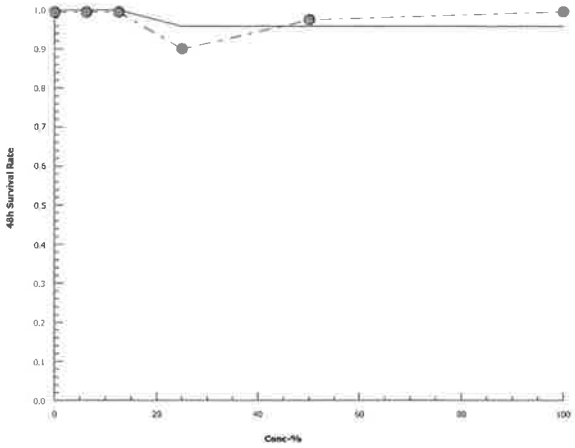
48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		9/10	8/10	10/10	9/10
50		9/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

Inland Silverside 96-h Acute Survival Test **New England Bioassay**

Analysis ID:	17-5418-9503	**Endpoint:**	48h Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	11 Jul-17 10:39	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



INITIAL CHEMISTRY INFORMATION

CLIENT: Gulf Oil Terminal - 003

PROJECT # 05.0045469.00

RECIEPT DATE	6/28/17	
SAMPLE	Effluent	Receiving Water
COC #	C37-2568	C37-2569
Temperature (°C)	6.4	9.1
Dissolved Oxygen (mg/L)	7.6	9.6
pH (standard units)	6.8	7.7
Conductivity (µmhos/cm)	860	42,800
Salinity (ppt)	<1	27
Hardness (as mg/L CaCO3)	126	4800
Alkalinity (as mg/L CaCO3)	85	95
TRC - DPD (mg/L)	0.125	0.024
INITIALS	CB	CB

Additional notes:

NEB SALTWATER SPEC 3 ACCLIMATION RECORD

Species: Menidia beryllina	Client: / Test ID:	Quantity: 560	*Mortality upon arrival
Source: Aquatic Indicators	Lot #: SS17AI(6.27)	Age: 9 days on 6.27.17	3
			* Mortality > 10% - Notify management

Allowable Mortality: > 5% mortality = Notify management.

Allowable Acclimation: Fish = No more than 50% tank volume water change over a 12 (twelve) hour period.

Mysids = Need to be +/- 2 ppt of test dilution water.

Water Chemistry						Observations					
Date	D.O. (mg/L)	p.H. (SU)	Temp. (C) *	Alkal. (mg/L) ml titrant	Sal. (ppt) **	Feedings			Behavioral observations	Do organisms look stressed?	Mortalities	Comments / Treatment type
						AM	NOON	PM	A = Normal, B = Erratic mov. C = Dead	Yes / No	# of dead organisms removed from tank	
				145								Acclimated to ASW.
6.27.17	9.5	7.8	22.7	29 ml	25	AH	AT	MG	A/C	No	4	
6-28-17	7.1	—	23.6	—	26	SJP	SJP	MG	A	No	0	6L ASW Water Δ
6-29-17	—	—	—	—	26	AT	SJP	SJP	A	No	0	6L ASW H_2O Δ
6.30.17	7.9	—	22.3	—	20	AT			A	No	0	6L ASW Δ, Salinity gradually adjusted to 15‰.

eurofins | Spectrum Analytical

SUBCONTRACT ORDER

SC36391

SENDING LABORATORY:

Eurofins Spectrum Analytical, Inc.
11 Almgren Drive
Agawam, MA 01001
Phone: (413) 789-9018
Fax: (413) 789-4076
Project Manager: Dulce Litchfield

RECEIVING LABORATORY:

GZA Geoenvironmental, Inc. - Manchester, CT*
77 Batson Drive
Manchester, CT 06042
Phone: (860) 286-8900
Fax: (860) 242-8389

BILL TO:

Eurofins Spectrum Analytical, Inc.
2425 New Holland Pike
Lancaster, PA 17601
Attention: Accounts Payable
accountspayable@eurofinsus.com
PO Number: SC36391

Project: Gulf Terminal - Chelsea, MA

Project #: Gulf Chelsea

PO Number: SC36391

Laboratory ID	Sample ID	Sampled	Matrix	Analysis	Due	Comments
	SC36391-01	27-Jun-17 10:00	Surface Water	Aquatic Tox	**14-Jul-17 16:00**	Client ID is Chelsea Creek/LC50

Containers Supplied:
Other (J)

C37-2569

Please send notice within 24 hours of obtaining valid data, of the results of all drinking water samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration. Notice should be emailed to SpectrumLabResults@EurofinsUS.com.

Please notify SpectrumLabResults@EurofinsUS.com immediately and prior to conducting analysis if certification is not held for the analyses requested.

Please e-mail results in electronic format to SpectrumLabResults@EurofinsUS.com.

Received ON ICE

Released By	Date	Received By	Date	Temp °C
	6-27-17		6/28/17	
Released By	Date	Received By	Date	

eurofins | Spectrum Analytical

SUBCONTRACT ORDER

SC36392

SENDING LABORATORY:

Eurofins Spectrum Analytical, Inc.
11 Almgren Drive
Agawam, MA 01001
Phone: (413) 789-9018
Fax: (413) 789-4076
Project Manager: Dulce Litchfield

RECEIVING LABORATORY:

GZA Geoenvironmental, Inc. - Manchester, CT*
77 Batson Drive
Manchester, CT 06042
Phone: (860) 286-8900
Fax: (860) 242-8389

BILL TO:

Eurofins Spectrum Analytical, Inc.
2425 New Holland Pike
Lancaster, PA 17601
Attention: Accounts Payable
accountspayable@eurofinsus.com
PO Number: SC36392

Project: Gulf Terminal - Chelsea, MA

Project #: Gulf Chelsea

PO Number: SC36392

Laboratory ID	Sample ID	Sampled	Matrix	Analysis	Due	Comments
	SC36392-01	27-Jun-17 10:00	Surface Water	Aquatic Tox	**14-Jul-17 16:00**	Client ID is Outfall 003/LC50

Containers Supplied:
Other (L)

C37-2568

Please send notice within 24 hours of obtaining valid data, of the results of all drinking water samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration. Notice should be emailed to SpectrumLabResults@EurofinsUS.com.

Please notify SpectrumLabResults@EurofinsUS.com immediately and prior to conducting analysis if certification is not held for the analyses requested.

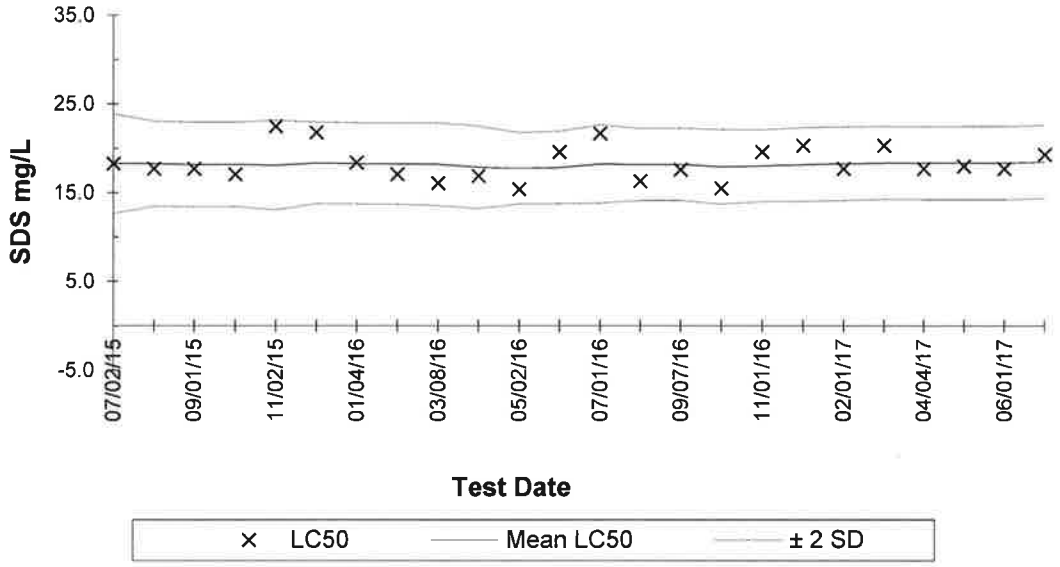
Please e-mail results in electronic format to SpectrumLabResults@EurofinsUS.com.

Received ON ICE

Released By	Date	Received By	Date	Temp °C
	6-27-17		6/28/17	
Released By	Date	Received By	Date	

New England Bioassay
Reference Toxicant Data: *Mysidopsis bahia* 48-hour LC50

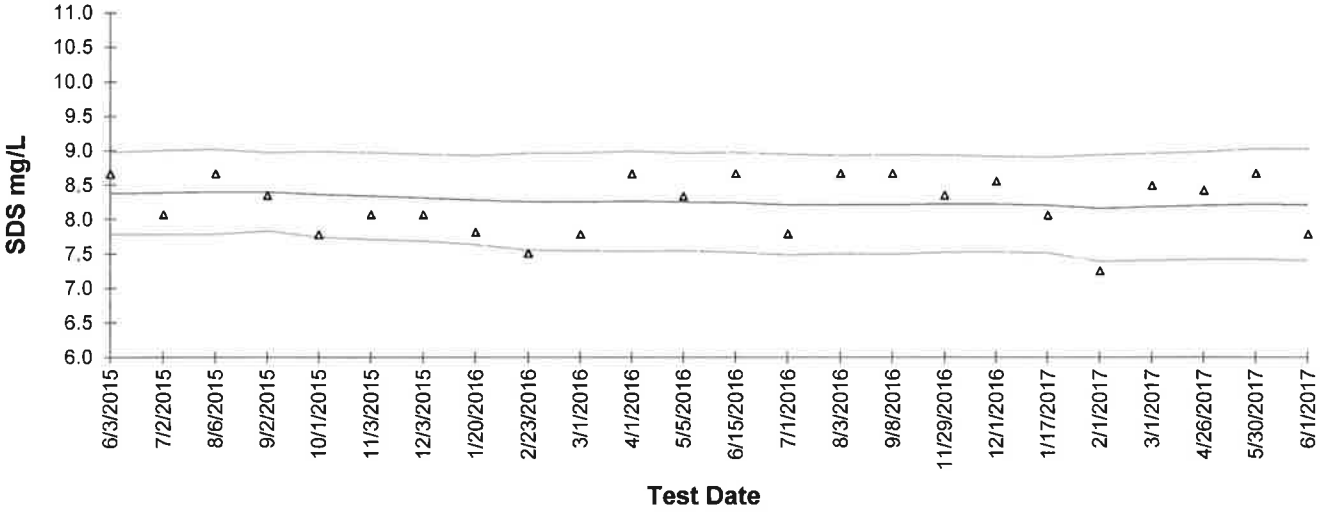
Reference Toxicant: Sodium Dodecyl Sulfate
Test Dates: July 2015 - July 2017



Test ID	Date	LC_{50}	Mean LC_{50}	STD	-2STD	+2STD	CV	CV National 75th & 90th%
15-900	7/2/2015	18.3	18.3	2.8	12.7	23.9	0.15	0.26
15-1082	8/3/2015	17.7	18.3	2.4	13.5	23.1	0.13	0.26
15-1296	9/1/2015	17.7	18.2	2.4	13.4	23.0	0.13	0.26
15-1458	10/1/2015	17.1	18.2	2.4	13.5	23.0	0.13	0.26
15-1687	11/2/2015	22.5	18.1	2.5	13.1	23.2	0.14	0.26
15-1776	12/1/2015	21.8	18.4	2.3	13.8	23.0	0.13	0.26
16-34	1/4/2016	18.4	18.3	2.3	13.7	22.9	0.12	0.26
16-142	2/1/2016	17.1	18.3	2.3	13.7	22.8	0.12	0.26
16-338	3/8/2016	16.1	18.2	2.3	13.6	22.9	0.13	0.26
16-460	4/1/2016	16.9	17.9	2.3	13.2	22.5	0.13	0.26
16-600	5/2/2016	15.4	17.8	2.0	13.7	21.8	0.11	0.26
16-709	6/1/2016	19.6	17.9	2.0	13.8	22.0	0.11	0.26
16-849	7/1/2016	21.7	18.3	2.2	13.8	22.7	0.12	0.26
16-1058	8/1/2016	16.3	18.2	2.0	14.1	22.2	0.11	0.26
16-1256	9/7/2016	17.6	18.2	2.0	14.1	22.3	0.11	0.26
16-1471	10/5/2016	15.5	17.9	2.1	13.7	22.1	0.12	0.26
16-1590	11/1/2016	19.6	18.0	2.0	14.0	22.1	0.11	0.26
17-9	1/3/2017	20.3	18.2	2.1	14.0	22.4	0.11	0.26
17-154	2/1/2017	17.7	18.3	2.1	14.1	22.4	0.11	0.26
17-273	3/1/2017	20.3	18.4	2.1	14.3	22.5	0.11	0.26
17-479	4/4/2017	17.7	18.4	2.1	14.2	22.5	0.11	0.26
17-697	5/10/2017	18.0	18.4	2.1	14.2	22.5	0.11	0.26
17-776	6/1/2017	17.7	18.4	2.1	14.2	22.5	0.11	0.26
17-977	7/5/2017	19.3	18.5	2.1	14.3	22.6	0.11	0.26

New England Bioassay
Reference Toxicant Data: *Menidia beryllina* 48-hour LC50

Reference Toxicant: Sodium Dodecyl Sulfate
Test Dates: June 2015 - June 2017



Test ID	Date	LC_{50}	Mean LC_{50}	STD	-2STD	+2STD	CV	CV National 75th%	CV National 90th%
15-705	6/3/2015	8.7	8.4	0.3	7.8	9.0	0.04	0.21	0.44
15-901	7/2/2015	8.1	8.4	0.3	7.8	9.0	0.04	0.21	0.44
15-1083	8/6/2015	8.7	8.4	0.3	7.8	9.0	0.04	0.21	0.44
15-1297	9/2/2015	8.4	8.4	0.3	7.8	9.0	0.03	0.21	0.44
15-1539	10/1/2015	7.8	8.4	0.3	7.7	9.0	0.04	0.21	0.44
15-1688	11/3/2015	8.1	8.3	0.3	7.7	9.0	0.04	0.21	0.44
15-1825	12/3/2015	8.1	8.3	0.3	7.7	8.9	0.04	0.21	0.44
16-108	1/20/2016	7.8	8.3	0.3	7.6	8.9	0.04	0.21	0.44
16-260	2/23/2016	7.5	8.3	0.4	7.6	9.0	0.04	0.21	0.44
16-303	3/1/2016	7.8	8.3	0.4	7.5	9.0	0.04	0.21	0.44
16-461	4/1/2016	8.7	8.3	0.4	7.5	9.0	0.04	0.21	0.44
16-602	5/5/2016	8.3	8.3	0.4	7.5	9.0	0.04	0.21	0.44
16-798	6/15/2016	8.7	8.2	0.4	7.5	9.0	0.04	0.21	0.44
16-850	7/1/2016	7.8	8.2	0.4	7.5	8.9	0.04	0.21	0.44
16-1060	8/3/2016	8.7	8.2	0.4	7.5	8.9	0.04	0.21	0.44
16-1282	9/8/2016	8.7	8.2	0.4	7.5	8.9	0.04	0.21	0.44
16-1705	11/29/2016	8.4	8.2	0.4	7.5	8.9	0.04	0.21	0.44
16-1739	12/1/2016	8.6	8.2	0.3	7.5	8.9	0.04	0.21	0.44
17-83	1/17/2017	8.1	8.2	0.3	7.5	8.9	0.04	0.21	0.44
17-155	2/1/2017	7.3	8.2	0.4	7.4	8.9	0.05	0.21	0.44
17-278	3/1/2017	8.5	8.2	0.4	7.4	9.0	0.05	0.21	0.44
17-595	4/26/2017	8.4	8.2	0.4	7.4	9.0	0.05	0.21	0.44
17-758	5/30/2017	8.7	8.2	0.4	7.4	9.0	0.05	0.21	0.44
17-777	6/1/2017	7.8	8.2	0.4	7.4	9.0	0.05	0.21	0.44

SC36391 BM

SPECTRUM ANALYTICAL, INC.
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HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:
- ☑ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: Andrew Adams
Gulf Oil LP
281 Eastern Ave
Chelsea, MA 02150
Telephone #: 617.884.5980
Project Mgr: Andrew Adams

Invoice To: Christopher Gill
Gulf Oil LP
80 William St, Suite 400
Wellesley, MA 02481-3705
P.O No.: _____ Quote/RQN: _____

Project No: Gulf Chelsea
Site Name: Gulf Chelsea Terminal
Location: 281 Eastern Ave, Chelsea State: MA
Sampler(s): Andrew Adams

F=Field Filtered 1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH_3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= none 12= _____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= _____ X2= _____ X3= _____

G=Grab C=Compsite

List Preservative Code below:

3	11	2	11	10	4		

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		Analysis: Ammonia	TRC, salinity, pH, TS, TSS	BTEX & naphthalene	PAHs	TOC	Total Recov. (Cd, Cu, Pb, Ni, Zn)*	LC50	Check if chlorinated
SC36391-01	Chelsea Creek	6-27	1000	G	SW				1		X							☐
	Chelsea Creek	6-27	1000	G	SW				1			X						☐
	Chelsea Creek	6-27	1000	G	SW	3							X					☐
	Chelsea Creek	6-27	1000	G	SW		1							X				☐
	Chelsea Creek	6-27	1000	G	SW	2									X			☐
	Chelsea Creek	6-27	1000	G	SW				1							X		☐
	Chelsea Creek	6-27	1000	G	SW				1								X	☐
																		☐
																		☐
																		☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☑ Standard ☐ No QC ☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards

* Report metals down to the MDL

Required Minimum Levels:
- BTEX - 2 µg/L
- naphthalene - 5 µg/L
- Group 1 PAHs - 0.1 µg/L
- Group 2 PAHs - 5 µg/L
- Cd, Pb, Ni - 0.2 ug/L
- Cu - 0.5 µg/L
- Zn - 5 µg/L

Relinquished by:	Received by:	Date:	Time:
		6/28/17	11:00
		6/28/17	1405

Temp °C: Observed 3.2 | Correction Factor 0 | Corrected 3.2 | IR ID # 02

☐ EDD format: _____
☑ E-mail to: aadams@gulfoil.com, cgill@gulfoil.com

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

SC 36392 1 8M

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 2

Special Handling:
- ☑ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: Andrew Adams Gulf Oil LP 281 Eastern Ave Chelsea, MA 02150 Telephone #: 617.884.5980 Project Mgr: Andrew Adams	Invoice To: Christopher Gill Gulf Oil LP 80 William St, Suite 400 Wellesley, MA 02481-3705 P.O No.: _____ Quote/RQN: _____	Project No: Gulf Chelsea Site Name: Gulf Chelsea Terminal Location: 281 Eastern Ave. Chelsea State: MA Sampler(s): Andrew Adams

F=Field Filtered **1**=Na_2S2O_3 **2**=HCl **3**=H_2SO_4 **4**=HNO_3 **5**=NaOH **6**=Ascorbic Acid
7=CH3OH **8**=$NaHSO_4$ **9**=Deionized Water **10**=H_3PO_4 **11**= none **12**= _____

DW=Dinking Water **GW**=Groundwater **SW**=Surface Water **WW**=Waste Water
O=Oil **SO**=Soil **SL**=Sludge **A**=Indoor/Ambient Air **SG**=Soil Gas
X1= _____ X2= _____ X3= _____

G= Grab C=Compsite

						Containers					List Preservative Code below:								
											3	11	3	2	11	11	10	4	
											Analysis								
Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		Ammonia	TRC, salinity, pH, TS, TSS	O&G	BTEX, naphtha-lene, TBA	Vinyl chloride, MTBE + Ethanol	PAHs and total phenol*	Fecal Coliform	TOC	Check if chlorinated
SC36392-01	Outfall 003	6-27	1000	G	SW				1		X								☐
	Outfall 003	6-27	1000	G	SW				1			X							☐
	Outfall 003	6-27	1000	G	SW		1						X						☐
	Outfall 003	6-27	1000	G	SW	3								X	X				☐
	Outfall 003	6-27	1000	G	SW		1									X			☐
	Outfall 003	6-27	1000	G	SW				1								X		☐
	Outfall 003	6-27	1000	G	SW	2												X	☐
																			☐
																			☐
																			☐

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☑ Standard ☐ No QC
☐ DQA*
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards:

- * Report phenol down to MDL
- Required Minimum Levels:
- BTEX - 2 µg/L; TBA - 10 µg/L;
- naphthalene and vinyl chl - 5 µg/L
- ethanol - 400 µg/L
- Group 1 PAHs - 0.1 µg/L
- Group 2 PAHs - 5 µg/L

Relinquished by:	Received by:	Date:	Time:
		6/28/17	11:00
		6/28/17	1405

Temp°C
Observed: 5.2
Correction Factor: 0
Corrected: 5.2
IR ID#: 02

☐ EDD format: _____
☑ E-mail to: aadams@gulfoil.com, cgill@gulfoil.com

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☑ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

SC36392 ✓ DW

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 2 of 2

Special Handling:
- ☑ Standard TAT - 7 to 10 business days
- ☑ Rush TAT - Date Needed: _____

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Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed.

Report To: Andrew Adams
Gulf Oil LP
281 Eastern Ave
Chelsea, MA 02150
Telephone #: 617.884.5980
Project Mgr: Andrew Adams

Invoice To: Christopher Gill
Gulf Oil LP
80 William St, Suite 400
Wellesley, MA 02481-3705
P.O No.: _____ Quote/RQN: _____

Project No: Gulf Chelsea
Site Name: Gulf Chelsea Terminal
Location: 281 Eastern Ave, Chelsea State: MA
Sampler(s): Andrew Adams

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11=_____ 12=_____

DW=Dinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: Total Recov. (Cd, Cr, Cu, Pb, Ni, Zn)*	LC50 **	Check if chlorinated
SC36392-01	Outfall 003	6-27	1000	G	SW				1	X		☐
↓ ↓	Outfall 003	6-27	1000	G	SW				1 AA		X	☐
												☐
												☐
												☐
												☐
												☐
												☐
												☐
												☐

List Preservative Code below: none

QA/QC Reporting Notes:
* additional charges may appply

MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
- ☑ Standard ☐ No QC
- ☐ DQA*
- ☐ ASP A* ☐ ASP B*
- ☐ NJ Reduced* ☐ NJ Full*
- ☐ Tier II* ☐ Tier IV*
- ☐ Other _____

State-specific reporting standards:

*** Report metals down to MDL**

****LC50 sub to GZA**

Required Minimum Levels:

Cd, Pb, Ni - 0.2 ug/L

Cu - 0.5 µg/L

Cr - 1 µg/L

Zn - 5 µg/L

Relinquished by:	Received by:	Date:	Time:
		6/27/17	11:00
		6/28/17	14:00

Temp °C: Observed 3.2 | Correction Factor 0 | Corrected 3.2 | IR ID # 02

☐ EDD format: _____
☑ E-mail to: aadams@gulfoil.com, cgill@gulfoil.com

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☒ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

eurofins | Spectrum Analytical

11 Almgren Drive
Agawam, MA 01001
(413) 789-9018

This preceding chain of custody has been amended to include the client requested additional analyses as noted below:

Laboratory ID	*Client ID*	*Analysis*	*Added*
SC36391-01	Chelsea Creek	Total Cadmium by ICPMS	7/12/2017
SC36391-01	Chelsea Creek	Total Lead by ICPMS	7/12/2017
SC36391-01	Chelsea Creek	Total Nickel by ICPMS	7/12/2017
SC36391-01	Chelsea Creek	Total Zinc by ICPMS	7/12/2017

eurofins | Spectrum Analytical

11 Almgren Drive
Agawam, MA 01001
(413) 789-9018

This preceding chain of custody has been amended to include the client requested additional analyses as noted below:

Laboratory ID	*Client ID*	*Analysis*	*Added*
SC36392-01	Outfall 003	Total Cadmium by ICPMS	7/12/2017
SC36392-01	Outfall 003	Total Copper by ICPMS	7/12/2017
SC36392-01	Outfall 003	Total Lead by ICPMS	7/12/2017
SC36392-01	Outfall 003	Total Nickel by ICPMS	7/12/2017
SC36392-01	Outfall 003	Total Zinc by ICPMS	7/12/2017

Batch Summary

'[none]'

Subcontracted Analyses

SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1710945

Microbiological Analyses

SC36392-01 (Outfall 003)

1710957

General Chemistry Parameters

1710957-SRM1
1710957-SRM2
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1710965

Total Metals by EPA 200/6000 Series Methods

SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1711007

General Chemistry Parameters

1711007-BLK1
1711007-BS1
1711007-DUP1
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1711008

General Chemistry Parameters

1711008-BLK1
1711008-BS1
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1711096

Semivolatile Organic Compounds by GCMS

1711096-BLK1
1711096-BLK2
1711096-BS1
1711096-BS2
1711096-BSD1
1711096-BSD2
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)
SC36392-01RE1 (Outfall 003)

1711116

Volatile Organic Compounds

1711116-BLK1
1711116-BLK2
1711116-BS1
1711116-BS2
1711116-BSD1
1711116-BSD2
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1711119

General Chemistry Parameters

1711119-BLK1
1711119-BS1
1711119-SRM1
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1711426

General Chemistry Parameters

1711426-DUP1
1711426-SRM1
1711426-SRM2
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1711573

General Chemistry Parameters

1711573-BLK1
1711573-BS1
1711573-CCB1
1711573-CCB2
1711573-CCB3
1711573-CCB4
1711573-CCB5
1711573-CCV1
1711573-CCV2
1711573-CCV3
1711573-CCV4
1711573-CCV5
1711573-SRM1
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

1712715

Total Metals by EPA 200 Series Methods

1712715-BLK1
1712715-BS1
1712715-DUP1
1712715-MS1
1712715-PS1
SC36391-01 (Chelsea Creek)

1712781

Total Metals by EPA 200 Series Methods

1712781-BLK1
1712781-BS1
1712781-DUP1
1712781-MS1
1712781-PS1
SC36391-01 (Chelsea Creek)

392124A

Subcontracted Analyses

BY50548-BLK
BY50548-DUP
BY50548-LCS
BY50548-MS
SC36391-01 (Chelsea Creek)
SC36392-01 (Outfall 003)

393336A

Subcontracted Analyses

BY50549-BLK
BY50549-LCS
SC36392-01 (Outfall 003)

394271A

Subcontracted Analyses

BY63775-BLK
BY63775-DUP
BY63775-LCS
BY63775-MS
SC36392-01 (Outfall 003)

394642A

Subcontracted Analyses

BY63775-BLK
BY63775-DUP
BY63775-LCS
BY63775-MS
SC36392-01 (Outfall 003)

S703654

Semivolatile Organic Compounds by GCMS

S703654-CAL1
S703654-CAL2
S703654-CAL3
S703654-CAL4
S703654-CAL5
S703654-CAL6
S703654-CAL7
S703654-CAL8
S703654-CAL9
S703654-CALA
S703654-CALB
S703654-ICV1
S703654-LCV1
S703654-LCV2
S703654-TUN1

S705262

Semivolatile Organic Compounds by GCMS

S705262-CAL1
S705262-CAL2
S705262-CAL3
S705262-CAL4
S705262-CAL5
S705262-CAL6
S705262-CAL7
S705262-CAL8
S705262-CAL9
S705262-CALA
S705262-ICV1
S705262-LCV1
S705262-LCV2
S705262-LCV3
S705262-TUN1

S705740

Volatile Organic Compounds

S705740-CAL1
S705740-CAL2
S705740-CAL3
S705740-CAL4
S705740-CAL5
S705740-CAL6
S705740-CAL7
S705740-CAL8
S705740-CAL9
S705740-CALA
S705740-CALB
S705740-ICV1
S705740-LCV1
S705740-LCV2
S705740-TUN1

S705799

General Chemistry Parameters

S705799-CAL1
S705799-CAL2
S705799-CAL3
S705799-CAL4
S705799-CAL5
S705799-CAL6
S705799-CAL7
S705799-CAL8
S705799-ICB1
S705799-ICV1

S705898

Volatile Organic Compounds

S705898-CCV1
S705898-TUN1

S706037

Semivolatile Organic Compounds by GCMS

S706037-CCV1
S706037-TUN1

S706180

Semivolatile Organic Compounds by GCMS

S706180-CCV1
S706180-TUN1

S706181

Semivolatile Organic Compounds by GCMS

S706181-CCV1
S706181-TUN1

S706219

Semivolatile Organic Compounds by GCMS

S706219-CCV1
S706219-TUN1